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INDEX

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ANALYSIS OF INDEX.

List of Principal Headings in the following Index, with pages on which they may be found.

	PAGE
ANNUAL AND EXTRAORDINARY GENERAL MEETINGS AND REPORTS	i.
CONTRIBUTED ARTICLES	i., ii.
CORRESPONDENCE	ii.
DIVIDENDS	ii.
GENERAL INDEX	ii, iii.
ILLUSTRATIONS AND MAPS	iii.
LEADING ARTICLES	iii.
MONTHLY REPORTS	iii., iv.
QUARTERLY REPORTS	iv.
SPECIAL ARTICLES	iv.
STATISTICS	iv.
OUTPUTS	v.

ANNUAL AND EXTRAORDINARY GENERAL MEETINGS AND REPORTS.

African and European Investment Co., 426
African Life Assurance Society, Ltd., 606, 610
Afrikander Proprietary Gold Mines, 124
Anglo-French Land Co., 42
Apex Mines, Ltd., 303

Bell Reef G.M. Co., 39
Breyton Collieries, Ltd., 406, ii., iii.
Bwana M'Kubwa Copper Mining Co., Ltd., 495

Cam and Motor, 469
Cape Asbestos Co., Ltd., 23
Cape Copper Co., Ltd., 502
Carolina Asbestos Co., Ltd., 406, ii.
Chartered and General Exploration and Finance Co., Ltd., 469
Chemical, Metallurgical and Mining Society of South Africa. 277 .
Consolidated Gold Fields of South Africa, Ltd., 383
Consolidated Main Reef Mines and Estatea, Ltd., 388, i.
Coronation Collieries, Ltd., 123
Coronation Syndicate, 122
Crescena (Matabele) Mines and Land Co., Ltd., 277

Daggafontein Gold Mining Co., Ltd., 609
Daggafontein Prospecting Syndicate, 502, ii.

East Rand Mining Estates, Ltd., 212
Elandsfontein Estate Co., Ltd., 406, ii.
Enterprise Gold Mining and Estates Co., Ltd., 502, iv.

Ferreira Deep, Ltd., 478, ii.
Frank Smith Diamond Estates and Exploration Co., Ltd., 502, vi.

Glynn's Lydenburg, Ltd., 303
Gold Fields Rhodesian Development Co., Ltd., 39
Gold Mines Investment Co., Ltd., 548
Great Britain Gold Mining and Estate Co., Ltd., 282

Hulett, Sir J. L. & Sons, Ltd., 179

Johannesburg Board of Executors and Trust Co., Ltd., 362, iv.
Johannesburg Consolidated Investment Co., Ltd., 254
Johannesburg Gold Fields, Ltd., 502, vi.

Kamfersdam Mines, Ltd., 177
Kleinfontein Estates and Township, Ltd., 124
Knighta Deep, Ltd., 234
Kroonstad Coal Estate, Ltd., 9

Lace Proprietary Mines, Ltd., 338, ii.
Langlaagte Estate and G.M. Co., Ltd., 546, 550, i.
Luipaardsvlei Estate and G.M. Co., Ltd., 430, ii.

Main Reef West, Ltd., 338, ii.
Mashonaland Agency Meeting, 42
Mashonaland Consolidated (1912) Company, 138
McCreedy Tins, Ltd., 123
Messina (Transvaal) Development Co., Ltd., 607, 614, ii.
Mine Managers' Association Annual Meeting, 598

Native Recruiting Corporation, 169
New Boksburg Gold Mines, 124
New Modderfontein G.M. Co., Ltd., 124, xii., 303
New Transvaal Chemical Co., Ltd., 549
New Transvaal Gold Farms, Ltd., 8
Nourse Mines, Ltd., 124, viii., 306

Oceana Consolidated Co., Ltd., 404

Phoenix Gold Mines, Ltd., 610
Pickstone Gold Mines, Ltd., 496
Pigg's Peak Development Co., Ltd., 549
Premier (Transvaal) Diamond Mining Co., Ltd., 478, v.

Rand Klip Gold Mining Co., Ltd., 235
Randfontein Central G.M. Co., Ltd., 544
Randfontein Estates G.M. Co., Witwatersrand, Ltd., 546, 550, iii.
Rhodesia Broken Hill Development Co., 496
Rhodesia Copper Co., 39
Robinson Deep Gold Mining Co., Ltd., 259
Rooiberg Minerals Development Co., Ltd., 211

Sakalava Oils, 235
Sheba Gold Mining Co., Ltd., 450, i.
Simmer and Jack, 121, 124, iv.
South African Alkali, Ltd., 406, ii.
South Afrian and General Investment and Trust Co., Ltd., 245
Sub-Nigel, Ltd., 122, 124, i.
Swaziland Tin, Ltd., 70

Tavistock Coal and Coke Co., Ltd., 124
Toronto (Rhodesia) Syndicate, Ltd., 84
Transvaal and Delagoa Bay Investment Co., Ltd., 335, 338, iv.
Transvaal Gold Mining Estates Ltd., 94, i.

United Engineering Co. Liquidation, 172

Van Ryn Gold Mines Estate, Ltd., 427, 502, i.
Vogelstruis Estates and Gold Mines, Ltd., 508

Wankie Colliery Co., Ltd., 502, iii.
Welgedacht Exploration Co., Ltd., 450, i.
Western Rand Estates, Ltd., 234
Willoughby's Consolidated Co., Ltd., 138
Witbank Colliery, Ltd., 547
Witwatersrand Commercial Exchange, 17

Zaaiplaats Tin Mining Company, Ltd., 360, 362, iii.

CONTRIBUTED ARTICLES.

Buying and Selling of Ores, The (Fulton), 200

Collapse and Recovery of the Bantjes Central Incline Shaft (Cazalet and Lawrie), 33, 59
Comparative Costs of Compressed Air and Electricity for use in Mine Stope Haulages, The (Middleton), 202

Distribution Plant of the Johannesburg Municipal Electric Supply System (Dobson), 450, 501, 542
Dumb-Bell Tube Mill, The, 244

East Rand, The (Mellor), 415, 435
Efficiency Engineering in Mines (McDonald), 32
Electrolytic Precipitation of Gold, Silver and Copper from Cyanide Solutions (Clevenger), 445, 467, 492, 514

Golden Age and the Mining Engineer, The (Saunders), 491

Handling Drill-Steel (McDonald), 543

Influence Moisture in the Air has on Mine Ventilation (Orenstein), 65
Is hand Mine Ventilation inadequate ? (A Correspondent), 103

Metallurgical Practice on the Rand (Bosqui), 14, 107, 160
Miners' Phthisis of the Rand, The (Watkins Pitchford), 486
Mining Conditions on the Rand (Honnald), 31, 71, 78
Mining Problems of the Eastern Rand (Holford), 7
Mining Prospects of German East Africa (King), 289
Miscellaneous Mine Accidents (Hutton), 41, 67, 87, 114
Monel Metal (Biddle), 475
Moving Ore in Flat Stopes (Weston), 318

New Coal-Dust Experiments, The (Heldane), 443, 465, 494, 515, 533

Oil Prospects in Portuguese East Africa (Mills-Davies), 29, 55
Oliphant's River Mica Belt, The (Hallimond), 343

Preparation of Large-type Boilers for Test (Marten), 170, 236, 310
Psychology of Advertisements (McDonald), 386

Rand Gold Mining Industry. Some Features of the (Caldecott) 490, 509
Recent Investigations on Dust in Mine Air and the Causation of Miners' Phthisis (Moir), 6, 36 57
Rock Drills in Use on the Rand (Weston), 156

Safety Measures at American Mines (Eavenson), 10
Status of an Engineer (Veasey), 430
Stoping Methods and Drilling Problems on the Witwatersrand (Weston), 81, 108, 136, 161, 183
Suggestions for a New Gold Law (Howard), 323

Tasmanian Orcharding for Rand Mining Men (Johnson), 16
Transvaal Mining in 1915 (Marriott), 596

War and the Diamond Industry, The (Kunz), 219
Water Supply of the Rand, The (Ingham), 15, 38, 88, 131, 159, 185, 203

CORRESPONDENCE AND DISCUSSIONS.

"African World" Red Cross, 278

"Barnato" Group Quarterly Reports, 278
British Motor Industry and the War, The, 278
British Trade Fair, 1916, 446

Canadian State Enterprise, 321
Chamber of Mines and the South African Expeditionary Force, 9
Chemists for Munitions Work, 83
Chemists and War Munitions, 531
Coal Industry and the Railways, The, 564
Coal Prospects on the Karroo, 321
Commission for Relief in Belgium, 353

Defunct Companies, 462
Diamond Fusion, The, 531
Dormant Mines of the East Rand, 191, 392

Eagle Rock Drill, The, 181

Far East Rand, 321
Far East Rand Dormant Mines, 446
Far East Rand, Potentialities of the, 463

Geological Museum, The, 112
Government Mineral Leases, 463

Johannesburg Forest and Land Co., 376

Karroo Coal Controversy, 517, 531, 584, 604
Karroo Coal Controversy, Chambers' Rejoinder, 584
Karroo Coal Prospects, 375, 392, 462

Life of the Wolhuter, The, 565

Mellors' Rand Geology, Dr., 83, 112, 462
Mine Regulation Anomalies, 531
Miners' Phthisis Prevention, 376
Mines and Recruiting, The, 43
Mining Dividends, 446
Mining Share Valuation, 298
Munitions and Industries, 353

National Diamonds, 604
New Metallurgy, The, 224

Orders for Wire, 353
Outlook for Tin, The, 224

Phthisis Money and how it goes ! 83
Plea for the Geological Museum A, 83

Rand Geology, 446
Rand Metallurigal Practice, 488, 560
Red Cross Mine Ambulance Competitions, 564
Robinson Deep Scheme, 298
Rooiberg Tin, 298

Royal Alfred Aged Merchant Seamen's Institution, The, 422

S.A Association of Analytical Chemists, 135
South African Red Cross, 181
State Mines and the Government, 584
State Mines' Prospects, 604

Tanganyika Concessions, 353
Telephone Troubles, 278
Transvaal Tobacco for our Troops, 321
Truck Shortage, Coalfields' View of the, 604

Unhealthy Conditions in the Mines of the Rand, and the Effects on Working Costs, 517

War and the Inventor, 9
What is "Adequate" Mine Ventilation, 204

DIVIDENDS.

African Banking Corporation, 566

Gold Mine Dividends, Transvaal, 393, 416

Johannesburg Board of Executors and Trust Co., Ltd., 362, iv.

Luipaardsvlei Estate and Gold Mining Co., Ltd., 265

Miscellaneous Dividends for 1915, 439

National Bank of South Africa, Ltd., 214, iv.

Standard Bank of South Africa, Ltd., The, 217

Witbank Colliery, Ltd., 590

GENERAL INDEX.

Absorption of Gold by the United States, 75
African Banking Corporation, 500
African and European Investment Co., 286, 487
African Life Assurance Society, 591
After the War : Two Views, 382
Albu Mines, Progress on, 512
Allgemeine Electricitats Gesellschaft, 502
Alluvial Tin Enterprise, 286
Alluvial Tin Mining, 480
Aluminium Production, Increase in, 13
American Competition, 381
American Enterprise, Indications of, 381
American Ships coming more regularly, 69
American Ships coming more regularly, A question of Quality, 74
America and Zinc, 2
Ancient Gold Workings in British East Africa, 1
Anglo-French Exploration Co., Ltd., 51, 74, 162, 504
Anglo-French Matabeleland, 372, 401
Anti-German Riots, 164
Antimony, 503
Antimony and Molybdenite, 173
Antimony Treatment at the United Jack, 339
Apex-Kleinfontein Mines, Ltd., 147
Appeal for Economy of Gold, 216
Appeal from the Trenches, The, 239
Australian Mining in 1914, 19
Australian Mining Industry, The, 147

Balkis Co., Ltd., 412
Bar Iron rapidly advancing, Imported, 519
Base Metal Units, 238
Basutoland Finances, 359
Battery Spares, Another big order out for, 519
Bearing Metal, Local Manufacture of, 589
Bechuanaland Trading Association, Ltd., 495
Beira Railway Co., Ltd., 334
Belgian Congo, In the, 74
Bell Reef, 66
Big Diamond Amalgamation, 479
Bogus "British Companies," 312
Brakpan Mines, 552
Brakpan Ore Reserves, 503
Brakpan's Increasing Profit, 148
Bravery Rewarded, 452
Brick Ground enquired for, 471
British Central Africa Co., Ltd., 314, 474
British Shops and Mining Machinery, 215
British Standardisation Rules for Electrical Machinery, 348
British Trade in South Africa, 376
Bronze Casting, Big, 284
Building Activity, 184
Bulawayo and General Exploration, 228
Bulawayo Syndicate, Ltd., 495
Bushveld Tin Area, The, 432
Business Erratic and Uncertain, 89

Cam and Motor Mine, 137, 248, 372
Cape Copper Co., 452
Cape Electric Tramways Company, 371
Cape Trade with Damaraland, 165
Carbide Lamps in Mines, 273
Carolina Asbestos Co., Ltd., 216
Cassel Cyanide Co., 538
Caustic Soda Process, The, 126
Cement, Extreme Scarcity of, 190
Champ d'Or, 82
Chartered Co. Meeting, 311
Chemical, Metallurgical and Mining Society, 363, 571
Cleaning Hollow Drill Steel, 49
Clifford Passes, The, 147
Coal Buying on the B.T.U. Basis, 94
Coal Experiment, A, 26
Coal for Egypt, 148
Coal Export Trade and the War, 266
Coal Industry, The, 554
Coal Rebate, The, 551
Coal from Somaliland, 148
Coal Trade and Shortage of Railway Trucks, The, 534
Compania do Nyassa, 498, 502
Commercial Exchange, 403
Comparison of Crushing Tests, 365
Conference of S.A. Municipal Electrical Engineers, 283
Consolidated Gold Fields Meeting, 266
Consolidated Mines Selection Company, 2
Copper, 312
Copper for Germany, 504
Copper in Germany, 593
Copper Mines in Serbia, 340
Copper and Tin Returns, 95
Crescens (Matabele) Mines and Land Co., 354

Daggafontein G.M. Co., Ltd., To Re-start, 399, 571, 592
Dearth of Shipping, The, 539

De Beers, 311
De Beers and Recruiting, 340
Definition of "Enemy," 148
Delagoa Bay Development Corporation, Ltd., 265, 317
Demand for Antimony, The, 387
Development in the Far East, 216
Diamond Deal, Reported, 404
Diamond Drills for Coal Prospecting, 141
Diamond Industry in Parliament, The, 298
Diamond Market, 523, 572
Diamond Mines in South-West, 591
Diamond Outlook, Secretary for Mines on the, 286
Diamond Position, The, 25, 364
Diamond Trade Improving, 592
Diamond Trade Recovering, 237
Diamonds in British Guiana, 505
Diamonds from China, 125
Diesel Engines in South Africa, 406
Dividends for 1915, 407
Dividends and Outputs, 363
Double Income Tax, 500, 503
Dumb-Bell Tube Mill, The, 216
Dynamite as Fertilizer, 368

Earth Tremors Commission, 504, 551
Earth Tremors Commission Report, 339
East Rand Amalgamation, A Suggested, 591
East Rand Mining Estates, Ltd., 173, 194
East Rand Proprietary Mines, 432
Economical Working, 552
Effect of War on the Steel Trade, The, 23
Effects of Damp Heat, 222
Eileen Alannah M. Co., Ltd., 329
Eldorado Banket G.M. Co., 137
Electric Light Contracts, 250
Electric Power for Farms, 338

Electrical Goods Scarce in Paris, 613
Electricl Small Bobbins, Phenomenal Rise, 381
Electrolytic Precipitation, 408
Employment in Johannesburg, 192
Enemy Trading, 409, 513
Enemy Trading Bill, 504
Enemy Trading and Mine Dividends, 173
English Companies with German Assets, 47
Engineer in War, The, 344
Engineering Shops Busy, 519
Engineering Standards, 126
Engineers, Mining and Military, 592
Enterprise, Gold, 496
Excess Profits Tax, 298
Exchange, London Metal, 574
Extra Lateral Rights, 387

Falcon Mines, 248
Far East Gold Production, 74
Far Eastern Rand, Hopes on account of, 471
Feeling the Pinch, 340
Fillip to South African Engineering, A, 96
First rise since the War of Motor Spirits and Paraffin, The, 115
For Miners at the Front, 479
Formosa G.M. and Prospecting Co., Ltd., 316
Frank Smith Diamond Co., 431
Fraser and Chalmers, Ltd., 334
Future of Rhodesia, 329

Gaika Gold, 217, 372
Galvanised Goods Rising, 331 357
Galvanised Iron again advancing, 250, 381
Galvanised Iron, Further Drop, 141
Galvanised Iron, Good arrivals of, 230
Gassing Accidents, 207
Geduld Extension of Reduction Plant, 95
Geduld Mine, 388
General Garage, The, 308
Geological Museum, The, 73, 524
Geological Society, The, 556
German Activity in Neutral Countries, 371
German Control of Belgian Mines, 85
German Trade, The War on, 543
German War Finance, 485
Germany's Hopeless Position as to Gold, 529
Giant Mines, 444
Globe and Phoenix, 216
Glycerine and Spelter said to be Commandeered, 301
Glynn's Lydenburg, Ltd., 216 412
Gold Field Rhodesian Development, 26
Gold Fields Report, 215
Gold Industry and the War, The, 193
Gold Mines Investment, 524
Gold, Reserves of, 572
Gold Supply, The, 174
Gold in Turkey, 238
Golden Kopje Mine, 66
"Goldfields" Meeting, The, 364
Goods coming forward even better 89
Government and the Far East, 339
Government Mining Revenues, 408
Graphite Factory, A, 250

Handling Ore in Stopes, 96
Harmony Block, The, 126
Hayes-Reynolds, 2
Heidelberg, Prospecting Activity at, 523
Heidelberg Prospects, 597
"History of the Diamond Fields" 74
Horse Power, Forty Thousand, 522
Hudson's Munition Making, 266

Imperial Chamber of Commerce, 566
Income Tax Collections, The, 195
Income Tax Problem, An, 312
Industrial Commission, The, 505
Industrial Development, 364
Institute of Industry, Ltd., 341
Insiza Mines, Ltd., 421
Insolvency Act, New, 513
Interesting Test of New Shaft Roller, 263
International Engineering Congress, 263
Iron and Steel Bounties, 474
Iron and Steel Trades in Britain, 447
Irrigation in the Union, 214

Johannesburg Electric Lighting 400
Johannesburg Gold Fields, 408
Johannesburg Travellers Visiting Coast Towns, 471
Jumbo Mine, 248

Kaalvallei Mine, 431
Kaffir Kraal in Liquidation, 374
Kamfersdam Mines, 148
Kick's Law Again, 387
Kimberley (Mashonaland) Co., 495
Klerksdorp Diamonds, 507
Knight Central, 58, 180
Koffyfontein Mines, 480

Laboratory Tests for Flotation, 394
Land Transactions in the New Protectorate, 311
Large Diamond, A, 552
Large Locomotives for the South African Coal Traffic, 406
Lead, 237
Legal Decisions affecting Mining 320
Licensee and Patentee, 334
Liquid Air v. Dynamite, 572
London and Westminster Industrial Syndicate, Ltd., 354
Lonely Reef Mine, 372
Lydenburg Progress, 438

Machinery Accidents on the Rand 51
Machinery Accidents on Rand Gold Mines, 93
Main Reef West, 95
Making Clean Specifications, 338
Manambolo Oil Syndicate (Madagascar), Ltd., 562
Manufacture of Munitions, The, 312
Market Changes, 389
Mashonaland Agency, 452, 487
Mashonaland Agency Reorganisation, 25
Matchwood, 225
Mayo (Rhodesia) Development Co., Ltd., 372, 421
McArthur Antimony Process, 480
Mechanical Stoking, Economy in, 522
Medical Examination of Employees, 374
Messina Co., 365, 470, 388
Messina (Transvaal) Development 532
Metal for Germany, 237
Metal Market, The, 442
"Metallurgy of Gold," The, 505, 588
Metals in 1915, 526
Metals Consumed in Shell Manufacture, 125
Metals and Munitions, 593
Mica, 238, 510
Middelburg Steam Coal and Coke Co., 432
Mine Dust Question, The, 194
Mine Employees' Leave Regulations, 364
Mine Models, 75
Mine Surface Tramming, 224
Miners and Minister, 308
Miners' Hours and Wages, 232
Miners' Phthisis, 148
Mines Buying Steel and Electrical Material, 567
Mines, Farmers' Mecca, The, 504
Mines Replenishing Stock, 497
Mines for Sale, 451
Mines Still Quietly Buying, 587
Mining Accidents, A Year's, 299
Mining Activity round Leydsdorp, 97
Mining Engineers at the Front, 340
Mining Poles Dearer, 331
Mining Proclamations, 422
Molybdenite, 193, 286
Molybdenite Production, 239
Molybdenite, Wolframite and Schulite, 238
Month's Trade, The, 180
Mozambique Macequece, Ltd., 452, 498
Municipal Electrical Engineers Conference, 265
Municipal Rates in the Union, 47
Munitions Committee, Work of the, 500
Munitions Manufacture Conference, 216

Natal Ammonium, Ltd., 18
Natal Coal for the Argentine, 150
Natal and Transvaal Coal Mines, Many Enquiries from, 497
Natal-Zululand Railway, 474
National Diamond Mine, 408
New City Loan, 529
New Coal Producer, A, 51
New Heriot Gold Mining Co., Ltd., 432
New Lisbon-Berlyn, Ltd., 472
New Metallurgy, The, 195
New Mining Work of Reference, A, 18
New Modder and Nourse Mines, 285
New Modder Prospects, 363
New Outlook in Britannic Affairs, The, 565
New Rand, Ltd., Re-starting, 339
New Rhodesian Mines, 372
New Self-Lubricating Roller, A, 170
New Taxation, The, 238
New Telephone Directory, The, 215
New Transvaal Chemical Co., 455, 523
New Vaal River Diamonds, 550
Nigel G.M. Co., The, 2, 504
Nigel may suspend Crushing, 147
Nikola Tesla on the Future of Electricity, 338
Nobel Dynamite Trust, Ltd, 165
North Charterland Exploration, 66
Northern Alluvial Tins, 387

Oceana Development Co., Ltd., 174
Officials' Certificates, 75
Oil and Colour Review on Expert Authority, 209
Oil Fields Structure, 189
Oils and Base Metals, Speculation in, 613
Oliphants Tin Mine, 407
Outlook, The, 572
Outside Districts, 407

Petrol, 613
Petrol and Paraffin Outlook, 210
Petrolex Motor Fuel, 362
Photographic Survey of South-West Africa, 17
Phthisis Prevention Report, 215
Phthisis Report, A Belated, 524
Piggs Peak Development, 524
Pilgrims Rest Mining Activity, 532
Portland Cement Manufactures, Ltd., 237
Portuguese Government, Good Order from, 423
Position of the Nigel, The, 194
Position of Spelta, 265
Premier Meeting, The, 591
Premier Report and Diamond Merger, The, 451
Pressure System of Mine Ventilation, The, 570
Prices of Steel Rails, 69
Probable Financial Situation after the War, 572
Problems of Mine Valuation, 105
Prospects of New Industries, 281
"Pull-U-Out," 362
Pulmonary Disease among American Miners, 563
Pyrite, 174
Pyrite Market, The, 286

Rand Industries, 184
Rand Mines Dividends, 503
Rand Properties, 471
Rand Water Supply, 571
Read's Drift Land Co., Ltd., 216
Recent Accidents and their Lessons, 207.
Recent Munition Conference, 264
Recruiting v. Business, 331
Recruiting interfering with Normal Conditions, 447
Red Cross Comforts for East Africa, 479
Red Cross Mine Ambulance Competitions, 552
Reduction of the Temperature in Mine Workings, 52
Reductions in Overland Coal Rates, 182
Research Work, The Value of, 476
Respirators and Dust in Mine Air, 287
Re-Starting the Diamond Mines, 281
Resuscitation after Electric Shock, 192
Retrospect of 1915 and Prospective of 1916, 423
Rhodesia Consolidated, 66
Rhodesia, Ltd., 66
Rhodesian Copper, 28
Rhodesian Mine Dispute, 354
Rhodesian Mine Labour. Rhodesian Chamber of Mines Report, 469
Rhodesian Mining Lawsuit, A, 194
Rhodesian Orders Slackening Off, 381
Rhodesian Record Output, The, 311, 503
Rhodesia Small Workers' Association, 495
Robinson Deep, Ltd., 523, 591
Robinson Deep Scheme, 127
Robinson Group, 265, 503
Roof and Floor Coverings, 182
Rose of Sharon and Shamrock Gold Mines (1911), Ltd., 469
Rubber Flex Unobtainable, 69

S.A. Cement Demand extra good, 89
S.A. Prospecting and Concessions Syndicate, Ltd., 444
S.A.R. and Coal Industry, 571
S.W. Transvaal Diamond Diggings, 104, 412
"Safety First," 557
Sakalava Madagascar Proprietary Oil Fields, Ltd., 13, 358, 476, 510, 614, iv.
Sakalava Oil, 96, 138, 591
Salts Industry, 407
Scheelite, 193
Scottish Mashonaland Mine, 248
Second Pan-American Scientific Congress, The, 487
Security Values, 2
Serbia Copper Mines, 600
Shaft Sinking, Bonus for Safety in, 525
Shamva G.M. Co., 421
Sheba Mine, 408
Shortage of Metals in Austria 232
Simmer and Jack Year, The, 52
Some Lessons of the War for Engineers, 338
South African and Base Metals 279
South African Export, 284
South African Imports of Iron and Steel, 390
South African Industries, 592
South African Investment Trust, 216
South African Municipal Insurance Fund, 145
South African Option Syndicate, 329
South African Railways, 24, 394, 425
South African Railways, Supplies for, 49
South African Salt Deposits, 388
South African Trade: Important Official Announcement, 73
South African Trade Prospects, 538
Southern Angola as a Market for Cape Products, 550
Southern Van Ryn Reef, 455, 470
Spitzkop Farm Gold Co., Ltd., 432
Springs Development, 175
Standard Price for Tin, A, 175
State of the Labour Market, The, 112

State Mines' Share Valuation Error, 552
Steadiness of the Stock Markets, The, 174
Steel Corporation and the S.A.R., 566
Steel, A " Pinch " in some classes of, 613
Stella Diamond Mining Co., Ltd., 504
Stock Exchange Values, 73, 96, 196, 409, 554
Straits and General Development Co., Ltd., 489
Subsidences in Colliery Districts 232
Surprise Gold, 279
Sutherland Reef, 237
Swaziland, 452
Swaziland Corporation, Ltd., 504

Tanganyika Concessions, 300
" Tank " Report, The, 56
Taxation of Gold Profits, 239
Telephone Directory, 340, 500
Timber likely to Advance, 230
Timber and Mining Material, 357
Timber Trade Conditions Explained, 190
Tin and Copper Returns, 408
Trade after the War, 366
Trade during and after the War, 537
Trade at Lourenco Marques, 302
Trade, Nine Months' Returns, 359
Trade in November, 532
Trade with South-West Africa, 47
Trading Companies' Dividends up to Normal for 1915, 447
Trading with the Enemy, 389
Trading in the Protectorate, 364
Transition in Metallurgy, 26
Transvaal Chamber of Mines Quarterly Report, 370
Transvaal Consolidated and Exploration Co., Ltd., 334
Transvaal and Delagoa Bay Investment Co., 363
Trend of Electrical Development, The, 117, 143
Trinidad and Golden Valley, 329
Tungsten and Molybdenum in England, 341

Unfortunate Gold Mine, An, 247
Union Finances, 194, 266
Union Mineral Output, 408
Union Oil Fields of South Africa, 286
Union Steel Co.'s Contract, 364
Union Steel Corporation (of South Africa), 480
Union's Untouched Sources of Wealth, The, 565
United African Lands, 286
United Jack, 126
United Rhodesia Gold Fields, 444
Use of Warm Tube-Mill Liner Bars, 214
Use Water, 287
Uses of Simple Language, 470
Uses of Zinc, 54

Valuable Compilation, A, 479
Ventilation of Deep Mines, 233
Vereeniging as an Industrial Centre, 340
Victoria Falls Power Company, The, 52
Victoria Falls Power Results, 2
Village Main Reef, 95, 432
Vira Mine, 431
Volksrust—Wakkerstroom Railway, 431

Wallpapers, Oils, White Lead, Iron and Steel, 587
War and American Trade, The, 26
Waste of Hiring and Firing, 267
Wave System of Power Transmission Applied to Rock Drills, The, 551
Welgedacht and Cloverfield Fusion, 524, 551
Welgedacht Exploration Co., Ltd., 388
West Rand Central Mine, 592
West Rand Consolidated, 453
What Excessive Gold Supply may do, 199
What the Mines Pay, 95
White Lead, 613
Willoughby's Consolidated Co., Ltd., 97
Wiro Ropes, A Boom in the demand for, 167
Witwatersrand Deep, Ltd., 599
Witwatersrand Northern Exploration, 285
Wolfram Question, The, 451
Wolhuter Gold Mines, 412
Worcester G.M. and Exploration Co., 480, 571
Workmen Mine Inspectors, 339, 526
World Supplies of Potash, 217

Yankee Doodle Mine, 401

Zanzibar, Conditions at, 359
Zinc, 311
Zinc-Dust, 238, 400

ILLUSTRATIONS, MAPS AND PLANS.

Bantjes Central, Views of Incline Shaft, 61, 62, 63
Bantjes Central, Diagrams of Incline Shaft, 59, 60, 61, 62
Bearing Metal, 589, 590
German East Africa, Sketch Map, 269
Murchison Range Sketch Map, 129
Oliphants River Mica Belt, 343
Rand Ore Reserve Values, Diagram showing Variations, 5
South West Africa, Sketch Map of Cretaceous Areas, 29
State Mines, New Tube Mills, 575
Tsumeb (S.W.A.) Copper Mine, 79
Vereeniging Power Station, 346

LEADING ARTICLES.

British Trade with South Africa, 342

Campaign against Mine Accidents The, 150
Coal Economy, 390
Coal Industry and the Railways, The, 525, 553

De Beers and the Diamond Outlook, 409
Dividend Position, The, 433

East Rand Debate in the Assembly, The, 593
Economics of Cyanide Consumption, The, 75
Elections, The, 175
Excess Profits Tax, The, 218

Far East Rand again, The, 313
Far East Rand Developments, 505

General Elections and Miners' Phthisis, The, 149

Geology and Rand Mining, 553
German East Africa, 268
Greater Robinson Deep and the Critics, The, 240

Holidays for Mine Workers, 288
How to Promote Industrial Peace, 128

Imperial Treasury and Rand Reconstructions, The, 481
Industry and Recruiting, 341
Inventors and Patent Law Reform, 128

" Johnnies " Annual Meeting, The, 239
Johnnies Report, The, 176

Low Quotations for Tin Shares, The, 314

Mellor on the Origin of Rand Gold, Dr., 594
Mellor's Rand Geology, Dr., 53
Miner in War, The, 98
Miners' Phthisis Compensation, 53
Miners' Phthisis Enquiry, 313
Miners' Phthisis Enquiry, The Progress of the, 481
Mines and Municipal Taxation, The, 3
Mines and Recruiting, The, 287
Mining Industry, The, 389
Mining Outlook, The, 217
Mining Questions for the New Year, 133

Native Labour Position, The, 410
New Patent Bill, The, 454

Outlook, The, 267

Patent Law Reform, 196
Pensions and Small Holdings for Miners, 573
Problems of the Outer Rand, 76
Progress of Mining in Rhodesia, The, 526
Progress of " Safety First " Movement, 3
Projected Diamond Merger, The, 505
Prospects of South Angola, 410

Rand Capital, Dividends and Profits Tax, 506
Rand Geology and the Institution of Mining and Metallurgy, 342
Rand and the University Question, The, 573
Relief Work in Belgium, 98
Re-Starting Diamond Production, 268
Review of the Industry, A, 97
Rooiberg and Zaaiplaats, 195

Science and the War, 127
Sidelights on Technical Education, 196
Significance of Gold, The, 4
Significance of Gold for 1915, The, 453
Small Holdings for Miners, 366
South African and Australian Industries, 390
South African Engineers and War Munitions, 365
State Aid to Mining, 176
State Encouragement to Mining, 27
State Socialism and the Far East Rand, 454

" The Goldfields " Rhodesian Interests, 53
Tin and Copper Prices, The, 218
Tin Prices and South African Tin Companies, 27

Trade after the War, 574

Views on the Industry, Three, 554

War Credit and Finance, 175
War, Mining and Commerce in Central Africa, The, 482
War and Rand Metallurgy, The, 76
War and the Union Ports, The, 434

MONTHLY REPORTS.

Albu Group, 37, 133, 249, 351, 441, 561
Amalgamated Properties of Rhodesia (1913), Ltd., 201

Barnato Group, 37, 133, 249, 351, 441, 561
Brakpan Mines, 30, 138, 273, 352 448, 562
City and Suburban, 274
Companhia de Mozambique, 16, 138, 202, 355, 422, 528
Consolidated Gold Fields Group, 37, 162, 271, 352, 470, 562

East Rand Proprietary Mines, 352

Globe and Phoenix G.M. Co., Ltd., 201
Glynn's Lydenburg, 33, 138, 273, 352, 446, 562
Goerz Group, 42, 133, 249, 351, 441, 561
Gold Fields Rhodesian Development Co., Ltd., 201

Knight Central, 562

Lonely Mine, 66, 208, 354, 401, 495
Luipaardsvlei Estate, 37, 138, 241, 352, 470

Neumann Group, 37, 133, 273, 352, 441, 561
New Heriot, 274
Nigel G.M. Co., Ltd., 32, 470

Rand Mines Group, 37, 133, 249, 351, 441, 561
Rezende Mines, Ltd., 208, 354, 495
Rhodesian Chamber of Mines, 39, 137, 228, 469
Rhodesian Small Workers' Association, The, 84
Robinson Group, 42, 135, 352
Romola Nigel Star Property, 66
Rooiberg Minerals, 58, 248, 352, 461

Shamva, 165
Sheba G.M. Co., 84, 104, 138, 241, 352, 455
Swaziland Tin, Ltd., 9, 99, 231, 358, 422, 529

Transvaal G.M. Estates, 39, 138, 245, 352, 474, 562

Willoughby's Consolidated Co., Ltd., 201

Zaaiplaats Tin Mine, 35, 155, 273, 358, 441, 502, 562

QUARTERLY REPORTS.

Antelope G.M. Co., 137, 165

Brakpan Mines, Ltd., 512

City and Suburban Gold Mining and Estate Co., Ltd., 247

Falcon Mines, 184

Geduld Proprietary Mines, 186
Glynn's Lydenburg, 186

May Consolidated G.M. Co., 186
Modderfontein Deep Levels, 186

New Kleinfontein, 241, 279, 528

Princess Estate and G.M. Co., 186

Rezende Mines, 401
Rooiberg Minerals Development Co., 518

Springs Mines, 508
Swaziland Tin, 541

Village Main Reef, 113

Wolhuter Gold Mines, 99

Zaaiplaats Tin, 9

SPECIAL ARTICLES.

Antimony in South Africa, 508
Arguments against the Robinson Deep Scheme, 274
Auriferous Antimonial Ores, 199
Australian Metal Exchange, The, 378

Chemical Trade and the War, The, 319
Coal Prospects on the Karoo, 292

Daggafontein Reconstruction Scheme, The, 413
Daggafontein Scheme in Detail, The, 580
Diamond Cutting : The Financial Aspect, 134
Disposal of the Far East Rand Gold Areas, The, 436

East Rand, The, 391
Economic Crisis in S.W. Africa, 324
Economics and the War, 155
Electro-Chemical Industries for South Africa, 577, 600

Ferreira Deep, Results and Prospects, 437
Flotation Concentration of Ores, The, 243

Geology of the Murchison Range, 178
German Patents and Trade Marks, 316
Goerz Mines, Recent Results from, 558
Gold and Diamond Mining in the Klerksdorp District, 489
"Gold Fields" Annual Review of Rand Mining, 325
Rand Mining, 325, 395

Handling Rock-Drills Underground on the Rand, 440
Holidays for Mine Employees, 291

Imperial Trade and Industry, 516
Income Tax: Report on Year's Working, 182

Kimberley and the Projected Diamond Fusion, 557

Labour and Industry: Official Monthly Review, 459

Losses in Tin Recovery, 101
Luipaardsvlei, The Improved Position of the, 272

Market for South African Asbestos, The, 105
Mine Managers' Views on Safety in Mining, 140, 187
Mine Ventilation: An American Example, 317
Mines, Their Employees and the War, The, 99
Mining Activity in the Pilgrims Rest District, 151
Mining and Metallurgy at the San Francisco Exposition, 208
Mining Prospects of the Murchison Range District, 129 198
Mining Prospects in Namaqualand, 576
Mining Prospects and Railways of German East, 269
Oil Shales near Wakkerstroom, 348

Organising British Engineering Industry, 458
Outlook for the Luipaardsvlei Estate, The, 371
Outlook for the Messina, 368
Outlook for Zaaiplaats Tin, 293
Outside Transvaal Mining Industries, 484

Phthisis Prevention Committee's Special Report, 222
Position of the Cape-Cairo Oil Company, 529
Position of the City and Suburban, The, 603
Position of Glynn's Lydenburg, The, 242
Position of the Nigel, The, 296
Position of the Nourse Mines, The, 102
Position and Prospects of Fraser and Chalmers, 294
Position and Prospects of Messina Copper, 347, 414
Position and Prospects of Rooiberg Tin Mines, 315
Position and Prospects of the Van Ryn Gold Mines, 411
Position and Prospects of the Witbank Colliery, 394
Position and Prospects of the Wolhuter, 578
Position of South African Tungsten and Molybdenum, The, 344
Position of Swaziland Tin, Ltd., The, 34
Position of the Transvaal G.M. Estates, 271
Practical Points in connection with the Use of Electricity in Mines, 337
Premier Diamond Mining Company: Annual Report, 457
Problem of the New Rand, Ltd., The, 295
Profits and Ore Reserves of the Government Areas, 575
Progress on Albu Mines, 223
Progress on Barnato Mines, 275, 581
Progress on Central Mining—Rand Mines Producers, 601
Progress on Corner House Mines, 369
Progress of the Madagascar Oil Fields, 457

Progress of the Neumann Group, 297, 579
Progress of the "Safety First" Movement, 455
Prospects of the Diamond Companies, 417

Rand Earth Tremors Committee's Report, 555, 582
Rand Metallurgical Practice, 511, 530, 583, 599
Rand Metallurgy in 1915, 456
Rand Mine Accidents: Prize Scheme Results, 595
Rand Mining Figures for 1915, 527
Randfontein Central Position, 485
Renewed Activity on the Klein Letaba Goldfields, 221
Review of the Diamond Trade, A, 156
Review of the Union Labour Market, 377

"Safety First" Prize Scheme, The, 30
"Small Mines" of the Transvaal, The, 177
South African Geology in 1915, 483
South Africans as Mining Engineers, 58

"T.C.L." Mining and Prospecting Activity, 221, 579
Trade Conditions in South Africa, 349
Trading with the Enemy: New Bill, 399
Transvaal Chamber of Mines' Quarterly Review, 82
Truth about Miners' Phthisis, The, 153
Underground Accidents on the Rand, 442
Union Coal and Base Metals in 1915, 507
Upper Witwatersrand System, The, 77

Valuation of Gold Mining Shares, The, 220, 241, 276
Value of Rand Ore Reserves, The, 5
Vereeniging Power Station, The, 345, 397

Year with the Consolidated Main Reef, The, 132
Year with the Johannesburg Consolidated, The, 180
Year with the Knights Deep, The, 173, 206
Year with the Main Reef West, The, 152
Year of Mine Native Recruiting, A, 158
Year with the New Modderfontein, The, 100
Year with the Rooiberg Tin Mine, The, 35
Year with the Simmer and Jack, The, 80
Year with the Sub-Nigel, The, 56
Year with the Zaaiplaats Tin Mining Co., The, 197

STATISTICS.

Coal and Labour, Natal, July, 13
Customs Union, 94

Gold, Transvaal, 163, 373

South Africa's Diamond Production, 16

Tin, Union, 367

Union Finances, The, 179
Union Mining Statistics for September, 225

Yield, Costs and Profits, 8, 106, 200, 330

OUTPUTS.

Coal Natal, 279, 432

Diamonds, South-Western Transvaal, 513

Gold, Manicaland, for 1915, 528
Gold, Rhodesian, 11, 84, 109, 205, 226, 327, 419, 535
Gold, Transvaal, August, 37, 64; September, 133; October, 246; November, 351; December, 441, 460; January, 559

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CONTENTS.

PAGE
Notes and News ... 1
Topics of the Week:
Progress of "Safety First" Movement ... 3
The Mines and Municipal Taxation ... 4
The Significance of Gold ... 4
The Value of Rand Ore Reserves ... 5
Recent Investigations on Dust in Mine Air and the Causation of Miners' Phthisis ... 6
Mining Problems on the Eastern Rand ... 7
Yield, Costs, and Profits in July ... 8
Correspondence and Discussion: "The Chamber of Mines and the South African Expeditionary Force," "War and the Inventor" ... 9
The Position of Zaaiplaats Tin ... 9
Mine Safety, Sanitation, and Welfare Bulletin:
Safety Measures at American Mines.—II. ... 10
Rhodesian Section:
Rhodesian Mineral Output for July ... 11
Metallurgical Practice on the Rand.—VI. ... 14
The Water Supply of the Rand.—VI. ... 15
Tasmanian Orcharding for Rand Mining Men ... 16
The Year with the Commercial Exchange ... 17
The Week in the Sharemarket ... 19
The Week in the Mining Material and Engineering Trades ... 21
Commerce and Industries ... 23
Engineering Notes and News ... 24

Notes and News.

Destitute Belgian Children: An Urgent Appeal.

WE have received, through Reuter's Agency, a message from Mr. Leo. Weinthal, editor of the "African World," London, stating that Her Majesty the Queen of the Belgians has appealed direct to the "African World" Red Cross to assist in providing for 3,000 Belgian children from villages around Ypres, who are in urgent need in view of the coming winter. We are asked to help in collecting £20, or as much as possible, towards a total of £1,000 required for this purpose by the 8th of September. The message is as follows:—LONDON, August 28.—Fully appreciating your splendid efforts to help your own funds, we ask your prompt attention to the following: URGENT.—Her Majesty the Queen of the Belgians has just appealed direct to the "African World" Red Cross to assist her to provide for 3,000 Belgian children, ages seven to thirteen, taken from villages in the present fighting area around Ypres, at present roughly housed, and fed on military rations through the kindness of the French Government. Sixty per cent are girls, mostly orphans; many are sick and wounded, and almost totally devoid of warm clothing, socks, boots, and all ordinary and necessary comforts for the coming rough winter months. To carry out this urgent mission we require over £1,000. Will you and your friends collect and help with £20, or as much as possible, and pay the money by the 8th of September to the credit of the "African World" Red Cross at Reuter's Telegraph Company, Capetown. Heartfelt thanks in anticipation. Writing mail.—Leo. Weinthal, editor, "African World." The facts speak for themselves. We will make an effort to collect and forward subscriptions to the amount stated, which will be duly acknowledged through our columns, as in response to Her Majesty the Queen of the Belgians' special appeal.

* * * *

Ancient Gold Workings in British East Africa.

It will interest South African readers to know that a gold-bearing reef has recently been discovered in the Mount Elgon foothills, upon one of the farms recently occupied in that district, writes a correspondent. The small quantity of ore tested from the outcrop gave satisfactory prospects, but of course it is yet premature to say whether the precious metal is present in sufficient quantity to justify development. To many people the main point of interest is that there are a number of old workings along the line of reef, possibly superficial prospecting holes or else old shafts which have fallen in since the workings were abandoned. "Old mining tools have been ploughed up upon this farm, and the owner recently, in excavating a deep trench, unearthed fragments of enamel ware kitchen utensils from hard clay—where they must have been lying for thousands of years. No doubt the early Arabs of Yemen—known in history as the Sabeans—who worked the Zimbabwe gold fields of Mashonaland, found their way down here in ancient times when the world was young; or it may possibly have been the Persians who alternated with the Sabeans in successive waves of colonisation for many centuries during the first settlement of the East African coast. Personally, the writer feels confident that we find here traces of the enterprise and daring of the old Sabeans, because some years ago, while travelling in Abyssinia and Arabia, he went into the question very carefully, with the result of being able to prove conclusively from extracts from the works of old Greek, Arabic, and Hebrew authors, in conjunction with local facts, that the ancient goldfields of Ophir were situated in Western Abyssinia, in a district not so very remote from Mount Elgon; and that in these days the Sabeans had caravan routes stretching right across the continent. Ruwenzori, which they called Jebel Kaf, and the Congo pigmies, were known to them a thousand years B.C."

Victoria Falls Power Results.

As was expected in view of the increased distribution announced on the Preference shares in June, the report of the Victoria Falls and Transvaal Power Company for 1914, just issued, records a substantial improvement in earnings. Revenue from power and lighting supply, dividends and interest received, etc., totalled £573,600, or £90,500 more than for 1913, while the net profit for the year, after allowing for Debenture interest, depreciation and other charges, showed an advance of £32,800 at £161,200. With the amount brought in the available balance is £266,400, as against £225,200. The dividends paid on the Preference shares amount to 8 per cent., as against 6 per cent., out of the earnings of 1913, so that 2 per cent. of arrears has been made good, and the dividend has now been met down to 30th April, 1914. The carry forward is increased by £1,200 to £106,400. Since the last report three 10,000 h.p. compressors have been brought into commission, and considerable extensions to the air-pipe system of the Rand Mines Power Supply Company, Ltd., have been made and put to work. At the Brakpan Power Station 33,500 h.p. of electrical plant has been added, and half of this is now in commission. The combined companies have now an ample reserve of air and electrical plant installed at their several stations. The judgment which was given against the company in the action by the Consolidated Langlaagte Mines, Ltd., was reduced by the Appeal Court from £29,000 to £19,000. Despite the war, it looks as if by the time the accounts for this year are completed the company should be able to bring its Preference dividend payments up to date. How soon the Ordinary shareholders will begin to participate in profits it is rather more difficult to say. The chairman, however, no doubt had something to remark on the subject at the annual meeting.

* * * *

Hayes-Reynolds.

A cable has been received by the local committee to the effect that a satisfactory settlement has been reached and adopted by the committee and life directors involving the abolition of life directorships and "B" rights. A new board has been formed, which has taken the whole situation in hand. The present chairman will retire, Mr. Chambers succeeding him. Mr. Chambers represents Messrs. G. and L. Albu.

* * * *

Security Values.

Ascertained as nearly as possible, the value of the 387 representative securities whose fortunes are followed by the *Bankers' Magazine* has depreciated by £98,589,000, or 3·3 per cent., between June 21 and July 20—the period of the great adjustment and the very partial rally thereafter. British and Indian Funds fell only 1·9 per cent., compared with 4 per cent. in Foreign bonds. Groups in which the depreciation exceeded 5 per cent. were Foreign Rails, 9·2; Industrials, 8·8; Colonial Rails, 8; Breweries, 7·9; Gas and Insurance shares, both 7·5; Canals and Docks, 6·9; Copper shares, 6·4; miscellaneous Mines, 6·3; Telegraphs, 5·8; and South Africans, 5·6 per cent. There were no increases, and the smallest decline was 0·1 per cent. in Waterworks.

* * * *

Mining Men at the War.

Recent bulletins issued by the Institution of Mining and Metallurgy in London have contained lists of members and associate members of the Institution who are serving with His Majesty's forces in the war, and have given details of promotions and casualities among them, including the names of many who have died in their country's cause. At the annual general meeting of the Institution held on March 18 last, the President, Dr. F. H. Hatch, stated that the war had evoked in the Institution a most gratifying response to the call of patriotism. The list of members, associates and students serving with the forces then totalled some 350, and was increasing daily. He knew that many of their members had been entrusted by the military authorities with highly responsible special duties, and that their performance of those duties had been commended by the authorities to whom they were responsible. Mr. H. S. Denny moved a resolution expressive of thanks to their gallant comrades at the front, who, while doing their share in the defence of the Empire, were carrying the shield of their brotherhood. The members of the Institution felt the warmest hopes for their safety and the sincerest wishes for their success. To those left behind, debarred by age or other disabilities, their welfare would always be a matter of the deepest concern. They were sure that, before this ruthless war ended, many instances of heroic deeds and dashing bravery would stand to the credit of their men.

* * * *

Daggafontein.

In June last it was officially stated that the Consolidated Mines Selection Company had acquired an interest in this Far Eastern Rand proposition with a view to participating in the further financing of the venture. According to the *Statist* in mail week, rumours were current that the Central Mining and Investment Corporation was also considering participating, though, the paper proceeds, "we have been unable to obtain confirmation of this." The issued capital of the Daggafontein Company is £536,507 in £1 shares. A shaft, which is the most easterly one on the Rand, has been sunk on the property, and in September, 1914, intersected reef at a depth of 3,580 feet, the average value over 40 inches width being 7.85 dwts. Subsequently, active operations were suspended owing to lack of financial resources, and at the meeting of the Company on the 14th of December last the chairman stated that it was estimated something like £750,000 would be required to bring the mine to the producing stage. The cost of sinking the shaft amounted to £248,500. It is a pity that times are so unpropitious for raising fresh capital for it certainly looks as if the Daggafontein might prove a profitable venture and a large gold producer.

* * * *

America and Zinc.

The high price of spelter has had the effect of increasing the smelting of zinc ores in the States. This has taken the form, not of new installations, but of re-opening old works; some of them have been idle for ten or fifteen years. Every effort is being made to take advantage of the present condition of affairs, and the plants that have recently been restarted are sufficient to turn out 100,000 tons more of spelter annually than was the case six months ago. When the price of spelter declines to the neighbourhood of normal, some of these plants will again be closed down. A good idea of the manner in which the zinc trade has progressed in the States may be gathered from an official report which says that for the five months ended May 31 the total exports of zinc metal, including contents of ore, were 588 short tons in 1914 and 59,263 tons in 1915, an increase of 58,675 tons this year. But the States will find some, if only small, competition, for Japan is erecting another zinc smeltery to treat Siberian ore, which previously went to Germany. Great Britain seems to be the only country that is not to reap any advantage from the present disorganisation.

* * * *

The Nigel.

In the course of the quarterly report for the three months ended June 30, the directors of the Nigel state:—"The development programme for exploiting the upper claims of the Marais Nigel ground referred to by the chairman at the last annual meeting, has been approved and is in course of prosecution. To equip the shaft down to 2,000 feet, which is the limit of the present programme, a capital outlay of approximately £4,000 will be necessary, and a sum of about £16,000 will be required for shaft sinking, etc. The latter sum will be debited to working costs according to the amount expended monthly, and, as it is anticipated it will take at least two years to sink the shaft to 2,000 feet the expenditure will consequently be spread over that period. The drives which will radiate north-west and south-east from the shaft should strike the ore shoots which it is anticipated exist in that locality. The expenditure of £20,000 should not be looked upon as altogether an additional charge against revenue, as the working costs in connection with the mining areas at the bottom of Nos. 7 and 12 shafts which, as you have been advised are nearing exhaustion, will gradually decrease and entirely disappear, and the cost of opening the new ground will, to a large extent, take the place of the expenditure in connection with the areas referred to."

TOPICS OF THE WEEK.

PROGRESS OF "SAFETY FIRST" MOVEMENT.

The "safety first" movement on the mines continues to gather strength daily. In an article in the second number of *The Reef*, the monthly issued gratis by the Rand Mutual Assurance Company, Ltd., the managing secretary of the latter body traces the history of "safety first" on the Rand. He states that the movement became active on these fields in the latter half of 1913, barely eighteen months ago, as the result of investigations and a report put before the directors by the officials of the Rand Mutual Assurance Company, Limited, coupled with the simultaneous appearance in the *Engineering Magazine* of an article entitled "The Conservation of the Worker." A sub-committee of three was formed in the first place, and the Government Mining Engineer and the Chief Inspector of Mines were amongst the earliest to give their active personal support. Other bodies have since been added, and are now represented on the Committee, which has swollen to 15, and more still are shortly to be added. The work the Committee has done has been in the direction of assisting all mines to profit by the Assurance Company's experience of past accidents (this extends to mines which are not insured with the Rand Mutual), to encourage rescue and ambulance work, and to disseminate information as to dangers. The means used, adds Mr. Bilbrough, have been the distribution of pamphlets, a digest of the Mining Regulations with marginal notes in plain language, lectures by Inspectors of Mines at various centres, the giving of rewards for bravery, prizes for ideas and suggestions, the posting of conspicuous notices on the mines, an almanac with "Safety" mottoes and information *re* accidents, articles in various newspapers, the preparation of a bioscope film which will shortly be shown, and, lastly, by the free monthly distribution of the magazine. The movement deserves encouragement and help from all. The latest manifestation of activity by the Committee is the decision to inaugurate a prize scheme on the Rand gold mines. This prize scheme embraces an annual competition which begins with the current year, so that the prizes will be donated on the basis of results for the year 1915. The awards will consist of a hundred-guinea shield as a floating trophy, as well as prizes to the underground officials of the winning mines. The committee realise that the accident rate is largely influenced by the disciplinary and precautionary measures adopted by the underground officials of a mine, and, apart from any idea of holding out special inducement to the officials to exercise every precaution to reduce the accident rate, it is felt that some tangible recognition should be given to the officials of the mines which show the most satisfactory records for the year. The prize scheme embraces two competitions, viz.:—

(1) To be decided on the best absolute record in respect of the accident death rate amongst employees underground due to accidents. The prize in this competition will be a parchment certificate to the winning mine, and a suitable memento of the value of about £3 to each of the underground officials on the mine.

(2) This competition will be confined to producing mines which have been milling for at least three years previous to the year of competition. These mines will be divided into three classes, according to the number of underground employees, white and coloured. Large mines, such as the East Rand Proprietary Mines, Ltd., and the Crown Mines, Ltd., will be divided into two or more sections. The winner in each of the three classes will be the mine which for the year of competition shows the best percentage improvement on its own underground accident death rate for the previous three years. Only underground fatal accidents, as recorded by the Mines Deartment, will be considered. The underground officials of the winning mine in each class will receive a bonus of £10, and the shield will be held for the year by the mine which shows the best result of the winning mines in the three classes. The names of the three winning mines will be engraved on the shield in order of merit.

In both competitions the underground officials who are eligible for the prizes are mine overseers, shift bosses, foremen timbermen, hanging-wall inspectors, and sand-filling superintendents (provided the two latter rank at least as shift bosses) who were in the employment of the mine on December 31 of the year of competition and have held their official positions for at least six months continuously during the year. The manager of the mine may use his own discretion to exclude any official he considers ineligible. Managers, assistant managers, and underground managers are not eligible for the prizes. It has further been decided that the competitions will be free to those mines who are members of the Rand Mutual Assurance Co. The scheme promises to become highly popular on the mines, and to stimulate interest in "safety first" as nothing else can.

THE MINES AND MUNICIPAL TAXATION

The Majority Report of the Local Government Commission on Municipal Taxation, though practically completed last year, has, for various reasons, only made its appearance this week. The Commission, it may be remembered, was appointed by the Transvaal Provincial Executive as far back as 1912 in answer to the agitation in favour of the municipal taxation of site values only. Its terms of reference were extended to embrace other questions, such as the municipal taxation of mining areas, regarding which its findings are of interest. The Majority Report, which is signed by Messrs. H. J. Hofmeyr, Julius Jeppe, T. Kleinenberg and J. H. L. Findlay, is a long and closely-reasoned document, and its recommendations may best be summed up in its own words, as follows: (*a*) That the present incidence of municipal taxation be not altered. (b) That land values only be not rated, but that the value of land and buildings continue to be rated as at present. (*c*) That the present rate limit be maintained. (*d*) That, while it is inadvisable by law to fix a limit to the profits on commercial services, no excessive profits should be made. (d) That the partial relief granted to holders of agricultural land remain in force as at present. (*f*) (1) That the freeholder's interest in mining land should be made rateable in as far as such interest consists in the right of the freehold owner to receive a share in claim licences, but that no attempt should be made to rate the freeholder's reversionary interest in mining land. (2) That the freeholder's interest in mining land which is made rateable property should be valued in the same way as other rateable property in accordance with Section 7 of the Local Authorities Rating Ordinance of 1912. (3) That the owner of the freehold of mining land should be entitled to obtain a revision of the valuation of his interest wherever he can show that there has been a substantial fall in the amount of claim licence revenue arising therefrom not anticipated at the date when the valuation was made. (*g*) That the Crown be assessed in respect of any land or interest in land held by it for any other than strictly Government purposes. (*h*) That the law regarding special assessment rates remain unaltered, but that authority to impose such rates be extended to village councils. (i) That land laid out and used for the purpose of sport or recreation, and controlled in accordance with rules approved by the local authority, be exempted from rating, provided that sport and recreation grounds conducted for profit and racecourses be not so exempted. In that portion of the report dealing with the mines, it is recalled that the Rating Ordinance exempts from rating any right to mine, and any land held or occupied exclusively for the exercise of mining rights, but "land or buildings used for residential purposes or for purposes not incidental to mining operations, whether by persons engaged in mining operations or otherwise," does not fall within this exception. Further, the mineral value of land not held for mining purposes is to be excluded in arriving at rateable value. The principle on which this exemption from rating of mining land and mineral values is based was stated in the third report of the Transvaal Financial Relations Commission issued in 1906, as follows: "(48) The Local Authorities Rating Ordinance carefully excludes mineral values from the definition of rateable property, and this indicates a division between sources of central and local taxation, from which, in the opinion of your Commissioners, no departure should be made. They have advised that all taxation on surface value should be reserved for local authorities, and if the sources from which national and local revenues are respectively drawn are to be separated and kept distinct, then mineral values should be reserved for the sole taxation of the State." Witnesses pointed out that by reason of the existing exemption the amount of revenue derived from mining property is, even in towns such as Johannesburg and Germiston, where a considerable portion of the municipal area consists of mining land, proportionately very small. Two suggestions were put before the Commission by Mr. Lucas as to conferring increased rating powers over mining land. The first suggestion was that mineral values should be subject to rating equally with surface values. The adoption of this proposal is excluded if the principle laid down in the extract from the report of the Financial Relations Commission, 1906, already quoted, is adhered to. "No adequate reason," says the report, "has been advanced for departure from this principle as regards the rating of mineral values. Mines are required to pay through their profits tax large direct contributions to the revenues of the State, and we consider that mineral wealth is, owing to its uneven distribution, far more suited to be the subject of national than of local taxation. It may further be remarked that municipal improvements do not directly affect mineral values as they do surface values, and it would, therefore, be difficult to justify the imposition of rates, e.g., on the capital value of the ore contents of a mine on the principle of benefits received. To rate mineral values would have the effect of handicapping mines which happen to be situate within a municipal area as compared with mines lying outside such area." The second suggestion put forward by Mr. Lucas was that the freehold interest in mining land should be rated, that is (*a*) the right of the freehold owner to a share of the claim licence revenue; and (*b*) the reversionary interest of the freehold owner which will become an interest in possession on deproclamation. The question of the use to which the surface of proclaimed land not actually required for mining purposes should be put is a national question of great importance. Suggestions for rendering this land available for agricultural purposes are made in the Report of the Small Holdings Commission. The Majority Report adds: "It will be apparent to any one who has read that report that the question is by no means a simple one, and it would be a mistake further to complicate the existing situation by passing legislation to enable local authorities to become the freehold owners of any proclaimed land in their areas. If the rights conferred upon local authorities by such legislation were exercised, then the responsibility for dealing with the surface of proclaimed land not required for mining purposes would be divided between the Union Government and the local authorities, and difficulties and deadlocks would certainly ensue. We consider that the question of reversionary rights to proclaimed land and of the use to which proclaimed land not required for mining purposes should be put can only be adequately dealt with by the authority responsible for administering the mining laws of the country, that is the Union Government." From the mining point of view, it will be seen that the Majority Report is an eminently sound and statesmanlike document that loses none of its weight or value by reason of the time devoted to its preparation and publication.

THE SIGNIFICANCE OF GOLD.

Apropos of the article in our last issue on gold mining as a war industry, a correspondent sends us some useful testimony to the value of gold in the form of an article in the *Saturday Evening Post* of Philadelphia. Says that paper: "'Money is gold, and nothing else,' as Morgan declared not long before he died. Every belligerent nation is frantic for gold. It has always been the great motive of human activity. To-day it is desired with a fervour that other times could not have appreciated. Gold alone inspires universal confidence. It alone will pay for munitions of war and imported foodstuffs. The Roumanian merchant driving twenty ox-loads of wheat across the border into Austria demands gold. The Dutch and Danish merchants must have it when they cross the border into Germany; and American manufacturers are not satisfied with less from the Allies. . . . As for gold, in war time it is like the blood of men. No nation can afford to lose it. Germany is in a peculiar position. She cannot lose any gold, except a little to Denmark and Holland; but neither can she gain a mark. Her problem is to discover, concentrate and utilise every gold coin and every gold ornament within her borders. For sheer efficiency nothing has ever equalled Germany's mobilisation of gold in the last few years—especially since the war began. So small was Germany's stock of gold until recently that French authorities took it for granted long ago that their enemy could not finance a war except by invasion. 'German forecasts even count in the largest measure on requisitions of food and money to be made in the enemy's country,' wrote Maurice Patron, an eminent French barrister, in 1908. 'Thus, financially speaking, Germany is conscious of being unable to carry on a modern war, with all the required development, unless it be on the express condition of operating in the enemy's territory. Financial mobilisation would compel Germany to invade at any cost; in no case could it sustain a war of any length of time in its own territory.' The Germans, however, knew their own weakness no less than the French. Many learned commissions sat on the subject, and professors with long titles wrote about it. They were prepared for this contingency as for so many others, and overwhelmed even French sagacity by both invading and proceeding to create gold reserves large enough to take care of any other kind of warfare. Only seven years ago the Bank of France held nearly four times as much gold as the Imperial Bank of Germany. Though the French have looked on the Bank of France as the keeper of the war chest ever since the days of Napoleon, and have steadily added to its gold stock year after year, yet, on May 27, 1915, the Imperial Bank of Germany had so nearly caught up with its rival that it held about three-fourths as much as the Bank of France. From July 31, 1914, to May 27, 1915, the stock of gold in the Reichsbank rose roughly from three hundred and fifteen millions to five hundred and eighty million dollars. This gold did not come from abroad or from gold mines, of which Germany has none. It had simply been annexed—commandeered by the government out of the pockets of the people. The business of gathering gold into the Reichsbank has been as systematically organised as any other operation of the German Government. In every community individuals and societies—even school children and barkeepers—have made it their business to canvass every individual for gold. House-to-house canvasses are made. All manner of prizes and bonuses are offered for those who collect the most gold; and, with the continual printing of editorials in newspapers and the distribution of hundreds of thousands of postcards, handbills and circulars explaining the need for gold, the movement to turn it into the Imperial Bank has swept the country like wildfire. There has been a perfect gold-hunting fever in Germany. Recently the *Frankfurter Zeitung* pointed out that there were more insidious enemies at home than in the trenches of Flanders or Poland. First of all, there is the man who declines to send his gold to the Reichsbank. He has a store in a stocking or an old trunk, and says to himself that, should the Fatherland be ruined, he will have enough to save himself, and that his couple of gold pieces don't matter. This is a most dangerous enemy. All manner of artificial restraints have been put on normal operations. Quotations of foreign-exchange rates have been forbidden. Buying or selling gold at a premium is forbidden. Exports of gold are forbidden. Travellers at the frontier, including neutrals, have often practically been compelled to accept bank notes for their gold. And quotations on all the stock exchanges of Germany, Austria and Hungary have been prohibited." No apology is needed for this lengthy quotation from a popular exposition of the value of gold, because it eloquently confirms all we have written on gold mining as a war industry.

THE VALUE OF RAND ORE RESERVES.

Increase of High Grade Ore at Modderfontein—The Bulk of Reserves over 27·6s.—Large Quantities of Low Grade Rock.

It is somewhat difficult to arrive at anything like a precise value of Rand ore reserves by reason of the fact that most companies now publish their reserve figures over a stoping width, and return them as mining tons, instead of milling tons. Since it is impossible to say what the rate of sorting is likely to be in any particular case, it is clear that no very definite estimate can be made of the probable recovery value of the ore. In the accompanying table the returns of some forty companies which were crushing during the years 1910 to 1914 have been analysed, irrespective of the division into mining and milling tons, and without taking account of the small proportion of the reserve values that are declared on an actual recovery basis. The percentages shown may be taken to represent fairly approximately the comparative proportion of the different grades of ore that have been available for milling during the years under review. The companies omitted from our list, which were milling in 1914, are the Consolidated Main Reef, Government Gold Mining Areas, Langlaagte Estate, Modder Deep, New Rietfontein, Van Ryn Deep, Robinson, and Village Main Reef, the two last as having ceased development some time ago. The conditions expressed by the diagram are represented by the following figures:—

	1910.	1911.	1912.	1913.	1914.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Over 36·1s.	4·45	3·35	6·05	5·80	10·41
From 34·0s. to 36·1s.	5·12	5·07	7·02	11·00	8·57
From 31·9s. to 34·0s.	11·43	9·34	1·59	—	—
From 29·7s. to 31·9s.	23·51	20·00	20·38	0·75	3·04
From 27·6s. to 29·7s.	23·12	32·92	33·55	45·81	30·82
From 25·5s. to 27·6s.	17·80	16·30	22·40	16·07	23·34
From 23·4s. to 25·5s.	8·32	2·72	0·82	8·30	10·53
From 21·3s. to 23·4s.	3·98	7·14	3·11	5·03	6·86
Below 21·3s. . ..	2·27	3·16	5·08	7·24	6·43
	100·00	100·00	100·00	100·00	100·00
	Tons.	Tons.	Tons.	Tons.	Tons.
Total reserve . ..	68,399.076	70.784.728	75.020.527	79.343.202	80.793,780

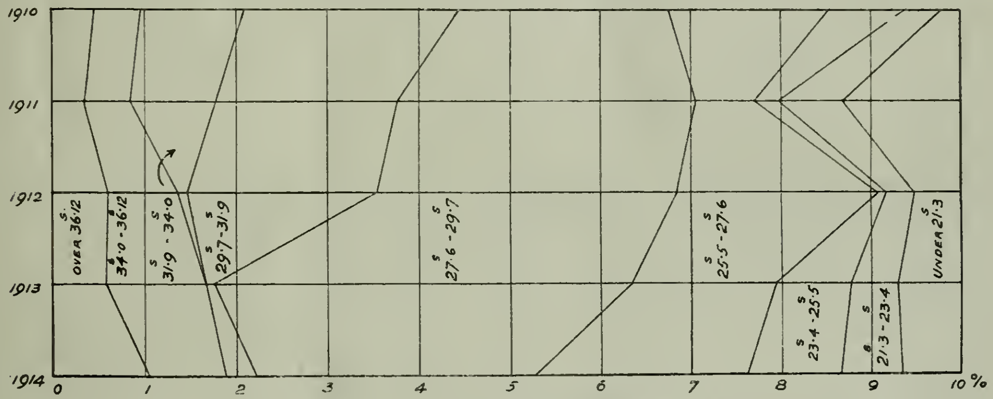

Diagram Showing Variations in Rand Ore Reserve Values.

A circumstance that attracts attention at the outset is the important increase that appears to have been made in the reserves valued at over 8½ dwts., or 36·1s, This is largely accounted for by the transference of a large quantity of reserves from the next lower grade in the case of the City and Suburban and Modder B. In the latter class some 4,547,000 tons of a value of 35·3s. in 1913 were increased to 6,334,500 tons of a value of about the same grade at New Modderfontein. It is evident that the excellent assay results and the large amount of development carried out by the Modderfontein mines have had a considerable influence upon the average grade of the Rand ore reserves during the last year or two. It can easily be seen that without the influence of these Far East reserves in the grand total of the Main Reef ore assets the worth of the latter in the aggregate would be appreciably diminished. There are in all some seven Central Rand companies on our list with reserves estimated at the end of 1914 to carry more than 34s. of gold per ton mined. They are the New Heriot with 588,315 tons, the City Deep with 2,510,800 tons, City and Suburban 758,700 tons, Ferreira Deep 1,893,100 tons, and the Meyer and Charlton, with the highest value of all at about 59s., credited with the very satisfactory reserve of 469,839 tons.

The Bulk of the Reserves.

By far the greater portion of the Rand ore assets are included between the 27·6s. and 29·7s. limits, about 30·82 being the percentage according to the last published returns. Within this category comes the vast quantity of 6,826,644 tons reported by the Randfontein Central, and the 5,400,000 tons of the East Rand Proprietary Mines. the value in each case being given at exactly the same figure, viz., 28s. per ton. It will be observed that ore of this quality has comprised the bulk of the reserves during the past five years, the percentage for 1913 being nearly half of the total declared, or, to be more precise, about 45·81 per cent. The proportion of the ore of the next lower grade has been increasing lately at the expense of the reserves of higher quality; in fact, from 1911 the rock of lower value than 27·6s. has been rapidly gaining upon that above it. The percentage of the higher grade reserves has diminished from 70·68 per cent. at the end of 1911 to 52·84 at the end of 1914. In the next class, below the 27·6s. limit, come the largest reserves declared by any single mine, the 10,022,000 tons of the Crown Mines, valued at 25·5s. per ton over a mining width of 66 inches. In the class from 23·4s. to 25·5s. are found the 3,957,100 tons of the Rose Deep, the 1,940,000 tons of the Robinson Deep, and the 999,400 tons of the Wolhuter, while in the next lower category, ranging from 21·3s. to 23·4s. per ton, are the 2,320,000 tons of the Simmer and Jack, the 825,900 tons of the New Goch, and the 1,781,231 tons at Kleinfontein. Still lower, under the 21·3s. limit, are the 2,680,000 tons of the Knights Deep, and the reserve of the Simmer Deep at 1,731,000 tons.

RECENT INVESTIGATIONS ON DUST IN MINE AIR AND THE CAUSATION OF MINERS' PHTHISIS.

[By JAMES MOIR, M.A., D.Sc., F.R.S.S.Afr.]*

The Committee on Miners' Phthisis Prevention has now been sitting for over three years, and I think the time has come for the publication of such of the new scientific methods of the Committee as I am myself responsible for, together with a synoptic view of the main results achieved. They deal mainly with the size, number, and other properties, of silica dust as found in mine air. This paper was written in May, but publication has been delayed because the Committee had not presented the results to the Minister of Mines, whom I have now to thank for permission to publish at once.

(1) *Rate of falling of quartz particles in air.*—According to Stokes' formula, the velocity of fall, given by $v=\frac{2\,g\delta a^2}{9\;\eta}$ (where $g - 980$ cm./sec, δ = density = 2.65, η = viscosity of air $=\frac{1{\cdot}9}{10^4}$ at 20° and 760 mm.) depends on the square of the radius (a) of the particle (assumed spherical). Hence a 1 micron diameter particle (radius 0·00005 cm.) falls at a rate of only 0·0075 cm. per second, whilst a 10 micron particle falls at 0·75 cm/second. Hence to fall through 5 ft., say, in a drive, will require 3½ minutes for a 10 micron particle, and no less than 5½ hours for a particle of 1 micron diameter. These are, of course, only approximations for the conditions of the Rand mines, as the viscosity of air here is probably 5 per cent. less than at sea-level, and in addition the effect of the particles not being spherical would increase the friction, and consequently increase the time required to fall: these factors consequently partly cancel one another.

It is obvious that the smallest particles formed in dry-drilling and by blasting cannot possibly settle at all in the eddying atmosphere of the mines, and if they come out of the mines at all, it must be owing to ventilation removing bodily the air containing them: dry-drilling is, of course, illegal.

(2) *Size and weight of quartz-particles found in mine air.*—In order to calculate the weight of such small particles (which are quite unweighable), it is necessary to assume a standard or average shape for them. My assumption is that they are rounded tetrahedra, and that, therefore, their volume is intermediate between that of spheres of the same diameter and that of tetrahedra of the same greatest diameter (seen in projection under the microscope). Examination of mine dust under the microscope, including determination of the thickness of large particles by their polarisation-colours, confirms this assumption, though the polarisation of particles smaller than 15 microns is too faint to be of any use. The volume of a sphere of diameter d is approximately $d^3/2$, and volume of a tetrahedron of projected diameter d is approximately $d^3/6$, so for the dust-particles I strike an average and assume the volume to be somewhere between $0.3d^3$, and $d^3/3$, when d is measured from the most prominent point of the particle to the middle of the opposite side (or curve). Take the case of a quartz particle measuring thus 10 microns (0.01 mm.) across. Its weight in grams will be 2.65 times its volume in cc., which assuming $V=0.3d^3$ gives $\frac{2{\cdot}65 \times 0{\cdot}3}{10^9}$ gm., or, say, $\frac{8}{10^7}$ mgm. (or, assuming $V=\frac{d^3}{3}$, $\frac{9}{10^7}$ mgm.). Striking an average, therefore, there are about 1,200,000 such particles to the mgm.†

In actual mine air the average size of the floating particles is less than 10 microns (probably 3 to 4 microns is a fair average) so the number of particles in a mg. of dust is correspondingly greater. Thus the smallest measurable particle (1 micron diameter‡) is so extremely light that it would require 1,200,000,000 of them to weigh 1 mgm. It should be noted, however, that many of the smallest particles in mine air, particularly after blasting, are not quartz, but come from the aluminous matrix of the banket: particles of sericite, chlorite and rutile or anatase are comparatively frequent in air after blasting, and when water-blasts are in use seem to resist wetting more than quartz particles do, and consequently remain unlaid. Analysis of this unlaid dust (caught in sugar) shows also a great increase with that present in the ore as a whole.

The very small size of dust particles in mine air is the main reason why respirators are of so little use as a protection underground. I have examined all the commercial makes available here, and find that the openings in the fabrics used are all much wider than 10 microns, one popular article, for example, having apertures up to 250 microns in diameter! Some idea of what a 10 micron particle is may be gained from the fact that 200-mesh screening has apertures of about 70 microns each in diameter, and 260-mesh, the finest made, has 50-micron openings.

(3) *Fall of quartz-particles suspended in water.*—This may again be calculated from Stokes' formula; putting in the viscosity of water for η in the formula (also $\delta - 1$ instead of δ) and modifying the result as before to suit the non-spherical nature of the particles. I find that the formula $V=\frac{7d^2}{100000}$ where V is the velocity of fall in cm. per second and d is the diameter in microns, gives very nearly perfect results. Thus a particle of 20 microns diameter is calculated to fall at 0.028 cm./sec., which agrees exactly with H. Stadler's observations; so a 60 micron particle falls at the rate of 0.252 cm./sec., which again agrees exactly with Stadler's observations. On the other hand, a 10 micron particle is calculated to fall at a rate of 0.007 cm./sec., whereas Stadler, working with Rand slime, found 0·010. I understand that Stadler explains this by a predominance of very fine pyrite in such slime, which through its density would give an abnormally high velocity of fall to such slime: but the measurement of such extremely low velocities is probably not very accurate, so that the discrepancy may not be significant.

Advantage has been taken of this knowledge to invent a process of sorting out mine dust, as caught from the air in sugar-tubes, into large and small particles. It was discovered by Dr. J. McCrae some years ago that all the silica particles observable in the lungs of fatal cases of miners' phthisis were exceedingly minute, generally under 3 microns in diameter, with none larger than 12 microns, and very few above 8 or 10 microns.§ Consequently, it became desirable in dealing with dust samples from air to effect a separation of all particles larger than 12 microns in diameter which had happened to be caught floating in the air, but which are presumably too large to be retained by the lungs and so cause miners' phthisis.

(*To be continued.*)

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*In the Journal of the Chemical, Metallurgical and Mining Society

†This is a minimum estimate, as no allowance for flat or narrow particles is made.

‡The wavelength of red light is 0·7 micron, consequently owing to diffraction-effects the microscope cannot define particles much smaller than 1 micron.

§See Bulletin 1 of South African Institute of Medical Research, Johannesburg, 1913.

MINING PROBLEMS OF THE EASTERN RAND.

[By W. G. HOLFORD.][*]

I AM not only indebted to the President for the remarks he was good enough to make in introducing the paper, but I am also fortunate in that the President has a comprehensive knowledge of the area under discussion. Before going into the various questions raised in the discussion, I would like to draw attention to the closing paragraph of the paper, the purport of which only admits of outlining the conditions which affect almost all the various departments of mining in their application to the development of a flatly-dipping metalliferous deposit at great depth, as in this area. Mr. H. M. Morgans has unfortunately taken my wording on the question of circular and rectangular shafts very literally; the point which I wished to emphasize hinges on the question of ventilation. If a rectangular (seven-compartment) shaft is equipped to its fullest capacity, far more ground can be raised through it than is required, and it is in this light that I stated that a "circular shaft of similar area to a rectangular form, though of equal hauling capacity"—that is for the tonnage required—"offers a greater space for ventilation." I am of opinion that the figures given by Mr. Morgans on friction surface go to show that the circular form offers less resistance to the passage of air, and this is still more accentuated when actual conditions are taken into consideration; for instance, the formations overlying the Witwatersrand beds would be sunk through in the upper portion of the shaft, and in the circular form would probably be lined throughout with brick or concrete. The Witwatersrand beds as a rule form good ground for sinking through, as any abnormal irregularities would be filled in by walling; in this form the shaft space is not filled up beyond the necessary girders and brackets to carry the air and water pipes and the ladderways, and the cages or skips would run in rope guides. On the other hand, a rectangular (seven-compartment) shaft is usually timbered throughout with 9in. square timber in sets, says, 7ft. apart, which with dividers, studdles and a pair of 8in. by 4in. guides in each compartment, in addition to the unavoidable obstructions such as air and water pipes asd ladderways, take up a large section of the area. The irregularities of the walls will, in all probability, be left as they were formed in sinking, consequently I maintain I am justified in stating that "the walls of this circular form offer less friction surface to the passage of air than the timbered rectangular section." I am of opinion that the conditions under which sinking takes place will control, to a large extent, the choice of the material to be used. In the circular shafts, however, the sections used are admittedly lighter owing to the strength afforded by the form adopted. With reference to Mr. Morgans' remarks on the position recommended for the sites of the two shafts, I clearly emphasized the importance of controlled ventilation and the allocation of the shafts to areas compatible with their most efficient use in relation to their hauling and air capacity. The great depth at which the ore bodies lie, and the extent over which the mining area has to be exploited before sufficient reliable data can be obtained, on the frequency and extent of the pay zones in relation to the poor ground, are cogent reasons for adopting this method. It is recognized that in the metalliferous mines, in the area under discussion, the method of mining, *i.e.*, on the dip grade with open stope faces, between levels, does not offer the same facilities for the control of air currents as in a coal mine; to overcome the stagnation consequent on such conditions the air must be pulled through the workings and conducted to the peripheries of the workings by splitting it from the main channels into properly prepared subsidiary ones, leading through the various districts. Under these conditions it would appear to be a disadvantage to put down two expensive shafts so close together as 200 feet, as obviously the majority of the workings would lie on the dip of both shafts, rendering their ventilation and exploitation difficult and costly. With reference to my diagram, showing by straight lines a general scheme for a lay-out of the workings, it merely indicates the principle generally adopted on these fields in developing an area on the plane of the ore body; the drives will naturally follow the contour of that body. A solid block of ground of approximately 400 feet square is indicated as the base of each shaft. On these fields a main incline communication between two shafts is frequently driven on an even grade in the immediate footwall of the ore body, and the local irregularities in the plane of the ore body caused by faults, etc., are sometimes adjusted by crosscutting from the shaft plane on to the plane of the ore body, or by slightly altering the grade of the incline to meet these deflections. The average grade of the incline can be determined from the known depth at which the ore body has been intersected in each shaft, or from boreholes, but the details in each case naturally depend on the local conditions of the deposition of the ore body. My figures with reference to the quantities of water handled in a sinking shaft per 24 hours can be verified by records of actual work done on the Rand. If Mr. Morgans will look up a paper read before the Institution on May 22nd, 1913,[†] on shaft sinking at the Springs Mines, by Mr. Bushell, he will see some interesting figures. From my own experience on the Daggafontein, 6,000 gallons an hour were taken off the bottom of the shaft, leaving it comparatively dry, by a single 400 gallon vacuum tank, which took 15 seconds to fill; the tank was hauled to the surface, emptied and was lowered again to be refilled in less than 3½ minutes at a depth of 3,000 feet; consequently, with tanks of the requisite capacity large quantities of water could be effectively handled. Such a scheme is suggested on page 6 of the paper under discussion. With reference to the use of rails as guides, there are instances where they have been used on these fields, but with indifferent success; in comparison with rope guides the rails require bearers to carry them, and the friction of the shoes against them was found to be far from satisfactory or economical. In dealing with the methods adopted for establishing ventilation during the initial developments, the term "cut off by doors" was used to indicate the temporary nature of the control of the up and downcast air currents in one shaft, by the division of the station at the base of a shaft, in which a door is suitably constructed for the convenience of traffic; the function of that door is to cut off the through current and direct it into the upcast portion of the shaft. My contention that in recent practice on the Rand the use of the electrically-driven turbine pump is favoured as it is economical to instal and maintain, is supported by its almost universal use in the new equipments on these fields, where the precaution is taken to filter the mine water. A case in point can be cited of an electrically direct-driven turbine being used in the Daggafontein shaft at a depth of 820 feet. The pump had a capacity of 500 gallons a minute, and was installed in a small chamber some 10ft. by 12ft., exclusive of sump capacity; it was run daily for 17 months without any maintenance, except occasional replacement of packing and slight cost for oil; the water was exceptionally clean; but this is by no means an isolated instance of low maintenance costs. My contention that "an air column of generous capacity installed down the length of the shaft not only constitutes a very efficient form of reservoir, but obviates any elaborate arrangements for such a provision on the surface," is supported by experience. It has, unfortunately, been too frequently the case that the principal air mains have not the capacity to feed economically the numerous off-shoots on an increasing development area; consequently, the air main down a deep shaft must be of commensurate capacity to feed the full demands of the mine. Such a main obviously forms a receiver of greater capacity than is usually installed on the surface. When speaking of mechanical haulage on underground roads, I used 100 h.p. motor on the dip, and 40 h.p. for the other motor on the rise, as an approximate proportion between the units required for the two classes of duty; obviously the actual power required must be dependent on the amount of work to be done. My reference to the growing use of the electrical unit as an economical and mobile power factor on these fields can be illustrated by the increasing use of it in hauling, pumping, milling, and in its application in numerous ways both on the surface and underground. Its mobility lies in its ready application as compared with the installation of steam or compressed air, which latter constitutes the main power factor of the earlier equipments. Mr. J. A. Dennison credits me with an opinion on the Witwatersrand ore deposition and accompanying values which is scarcely so expressed in the paper under discussion. Economic gold values, though they are contained in irregular areas or zones, exist throughout the ore bodies, and where they occur in conjunction with thickness, they obviously constitute a greater economic value. In the eastern area a distinct sinuosity in the strike of the outcrop and sub-outcrop of the ore bodies has been established, presenting a condition of folds forming shallow basins and ridges. In this area, up to the present time, the majority of the crushing mines are situated in the basins, or on their adjacent limbs. The aqueous origin of the ore body accounts for the vagaries in the thickness of deposition; it is, therefore, quite natural that thin and thick sections should occur throughout this area. I make no attempt to elaborate any scheme in its entirety, but merely to indicate the various functions which will absorb the working capital of a deep level proposition under the general conditions enumerated. Mr. Dennison's figures, however, are very interesting as indicating the lines on which provision for capitalising a venture in this area must follow, involving, as it will do, so large an expenditure in working capital. In calculating the present value of net profits the life of 45 years was after all assumed arbitrarily. I do not insist that this is the best period from a present value point of view; but until a considerable amount of exploration has been done, it is impossible to make even a rough estimate of the probable life, and in the first instance a plant should be designed in such a manner that it can easily be added to in order to bring the life within more economic limits. The Jumpers Gold Mining Company took 25 years to work out 39 claims, but in the area under discussion there are distinct indications in the present crushing and developing mines that the payable zones are not so closely associated with one another, and that this fact, in conjunction with the shallow dip for the ore body, will necessitate a larger area being allocated for individual mining ventures. Mr. E. Homersham's expression "incoherent" was, in my opinion, not justified; the paper is intended to indicate the various developments from inception to a crushing stage. The item £125,000 for initial development is estimated to account for, say, 20.000 feet of driving and winzing, and on blocks 500 feet square would represent a large area; the commensurate development required for milling 540,000 tons per annum would, however, not be complete at the start of milling operations, nor would that quantity be milled in the earlier stages. In dealing with the area required for a mining proposition in this area, I used the 2,000 claims as a basis, in distinction to the areas where steeper dips of the ore body exist, owing to the irregular deposition of the ore body and the occurrence of profitable zones. I would not care to assume that an average block of ground in that area would contain 50 per cent. of payability. It is obvious that the initial stages of any proposition must prove satisfactory before the scheme can be carried any further, and the 50 per cent. was adopted as an indication of developments already in progress in the area under discussion. The grade of 25s. was cited as a minimum basis under present average working conditions; there is no intention on my part to place any value on undeveloped ground. I can endorse Mr. Homersham's opinion that in the initial stage it is not advisable to carry out development drives other than in the reef. The straight-lined diagram accompanying the paper has already been explained; it is obvious that to obtain an intimate knowledge of the value of the ore body the exploration work must be driven along it. In connection with Mr. Trewartha-James's remarks, several circular shafts were sunk during the earlier history of the Rand to shallow depths. It is only within recent years, however, that this form had been adopted for greater depths, and those responsible for the sinking of them should be in possession of some interesting data. With regard to Dr. Henderson's remarks, he touches on a subject rich in theories. The geological aspect is now being investigated by the Department of Mines, the results of which should be available at no distant date. My reference to the greater thickness of banket being found in the basins, is based on the fact that the majority of the present producing mines of this area are situated in the basins or on their adjacent limbs; but, as already stated in replying to Mr. Dennison, owing to the vagaries in ore deposition, it is quite natural to find thin sections in the basins and the reverse on the anticlines, and as the richer gold zones are impartial in their distribution, there are instances of both thickness and value being found on the lower limbs of the anticlines. This, however, does not appear to me to be inconsistent with the statement made; I do not claim that enrichment is confined to the syncline, but that where a gold zone is found in conjunction with thickness, it is of greater economical value, owing to its bulk.

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[*] Before the Institution of Mining and Metallurgy.

[†] Transactions, vol. xxii., pp. 701-13.

YIELD, COSTS, AND PROFITS IN JULY.

Official Analysis by the Transvaal Chamber of Mines—Some Excellent Returns.

The monthly Transvaal Chamber of Mines analysis of gold production in the Transvaal for July, 1915, shows, *inter alia*:—

THE WITWATERSRAND.

	Tons.	Value.	Ounces.	Yield per ton.		Cost per ton.		Profit.
		£		s.	d.	s.	d.	
Aurora West United ...	15,000	18,652	4,391	24	10	19	0	4,123
Bantjes Consolidated ...	20,500	22,759	5,358	22	2	20	7	1,304
Brakpan Mines	64,300	90,736	21,361	28	2	18	0	32,181
City and Suburban ...	28,750	51.121	12,035	35	7	21	2	20,625
City Deep	60,000	124.238	29,248	41	5	20	2	62,196
Cons. Langlaagte	51,600	68,414	16,106	26	6	14	6	31.008
Cons. Main Reef	28,110	40,655	9,571	28	11	19	7	12,322
Crown Mines	206,000	273,694	64,433	26	7	16	4	101,531
Durban Roodepoort ...	14,966	14,757	3,474	19	9	15	4	3,260
Durban Rood. Deep ...	28,000	37,949	8,934	27	1	22	7	5,829
East Rand Prop.	164,000	218,907	51.535	26	4	19	5	53,690
Ferreira Deep	52,320	85,672	20,169	32	4	20	1	30,668
Geduld Proprietary ..	26,050	38,382	9,036	29	6	20	0	12,187
Geldenhuis Deep	51,000	68,915	16.224	27	0	22	7	10,353
Ginsberg	15,800	18,010	4,240	22	7	17	9	3,841
Glencairn Main Reef...	22,090	14,574	3,431	12	11	11	0	2,077
Government Areas	45,000	64,676	15,226	28	5	21	1	17,216
Knight Central	25,500	26,867	6,325	21	1	18	7	2,596
Knights Deep	100,600	73,371	17,273	14	7	12	2	12,079
Langlaagte Estate	52,649	59,545	14,018	21	3	17	9	12.803
Luipaardsvlei Estate ...	21,320	23,303	5,486	21	10	19	6	2,242
Main Reef West	24,790	29,917	7,043	24	2	20	2	4,334
May Consolidated	14,490	10,989	2,587	15	2	13	9	1,003
Meyer and Charlton	14.995	33,922	7,986	45	3	18	2	20,036
Modderfontein B. .	42.000	86,212	20,296	41	1	16	3	50,900
Modder Deep Levels...	34,500	64,026	15,073	37	1	16	10	34,809
New Goch	30,500	29,806	7,017	19	3	14	1	8,061
New Heriot	13,400	23,494	5,531	35	1	21	5	9,006
New Kleinfontein	54,350	71,392	16,807	26	3	17	0	24,223
New Modderfontein ...	52,500	105,331	24,797	40	2	16	11	59,362
New Primrose	21,700	18,885	4,446	17	4	12	4	5,474
New Rietfontein	8,384	6,482	1,526	14	3	16	3	*694
New Unified	13,600	14,060	3,310	20	4	13	0	5,002
Nourse Mines	57,500	71,765	16,895	25	0	20	3	12,627
Princess Estate	22.600	28,608	6,735	25	4	25	4	*153
Randfontein Central	214,646	244.011	57,445	22	8	17	3	57,032
Robinson G.M.	55,000	81,251	19,128	29	7	14	2	41,080
Robinson Deep	55,700	78,107	18,388	28	1	18	3	23,729
Roodepoort United	34.020	29,012	6,830	16	8	16	11	81
Rose Deep	68,600	82,465	19,414	23	8	16	10	23,482
Simmer and Jack	70,100	83,735	19,713	23	11	13	8	31,065
Simmer Deep	61,800	46,160	10,867	14	10	14	4	4,257
Van Ryn Estate ..	37,750	43,747	10,299	23	2	14	5	16,244
Van Ryn Deep	44,250	80,206	18.882	36	3	16	5	43,827
Village Deep ...	52,000	79,726	18.769	29	0	18	10	29,184
Village Main Reef ...	31,560	54.469	12.823	34	6	18	9	24,108
Vogelstruis Estate	15,133	14,149	3,331	18	8	17	3	1,128
West Rand Central ...	2.043	2.736	644	23	10	27	9	*99
West Rand Cons.	31,500	39,886	9,390	25	4	18	11	9,700
Witwatersrand G.M. ...	43,510	54,673	12,871	25	1	14	7	22,971
Witwatersrand Deep ...	42,920	56,461	13,292	26	4	17	2	18.352
Wolhuter G.M.	36,000	42,957	10,113	23	9	16	4	13,068
Miscellaneous producers	—	10,143	2,388	—		—		—

* Loss.

OUTSIDE DISTRICTS.

	Tons.	Value.	Ounces.	Yield per ton.		Cost per ton.		Profit.
Heidelberg—								
Nigel	11,400	15,670	3,689	27	6	25	10	744
Sub Nigel	6,570	12,781	3,009	38	11	32	11	1,811
Barberton—								
Barrett	3,438	1,066	251	6	2	—		—
Fairview (T.C.L.)	2,090	3,165	745	30	3	25	11	403
Sheba	6,750	9,515	2,240	28	2	24	10	1,136
Worcester Exploration .	5,450	3,683	867	13	6	13	5	14
Klerksdorp—								
Quest	3,209	2.757	649	17	2	15	5	273
Lydenburg—								
Ceylon Lydenburg	945	896	211	19	0	18	5	14
Glynn's Lydenburg	4,100	7,136	1,680	34	10	20	1	3.278
Rietfontein (T.C.L.) ...	1,135	1,410	332	14	9	17	5	68
Transvaal G.M. Estates	12,925	32,937	7,754	49	9	24	4	16,004
Miscellaneous producers	—	27,262	6,418	—		—		—

New Transvaal Gold Farms, Limited.

The annual general meeting was held last week of the New Transvaal Gold Farms, Limited. Mr. D. Symons presided. The Chairman said: In moving the adoption of the report and accounts your directors regret very much that they are only able to propose the payment of a dividend of 5 per cent. instead of the usual 10 per cent. The profit made during the period under review compares favourably with that of the previous year, and would have been almost sufficient to have given you a 10 per cent. dividend, but owing to the abnormal times payments due have been difficult to collect, and your Board have not thought it advisable to press unduly their debtors, seeing they are so thoroughly secured. During the year the Board have sold three farms, in extent 13,900 acres. This has reduced the company's holding to 167,018 acres of freehold land and 18,779 acres over which you hold the mineral right, a total of 185,797 acres in all, and it is the intention of your Board to replace the farms sold whenever favourable opportunities present themselves. During the year several of your farms have been examined and reported on. Many of them are most suitable for ranching. Your Board are also arranging for a system of improving leases, that is, letting farms for a term on condition that trees are planted and dams built. This so far promises to be very successful. Two of our farms in the Wolmaransstad district have been re-surveyed and found to be of the extent of 625 morgen more than the original estimate. The value of these 625 morgen is at least £1,000. Your issued capital to-day remains at the same amount as last year—namely, £47,500, against which you have 167,018 acres of freehold land in the best stock and agricultural districts, bonds to the amount of approximately £10,000 carrying 6 per cent. interest and mineral rights over 18,779 acres. Your directors, therefore, consider your company in a very sound position, and have every confidence in its future success. The report and dividend were agreed to, and the retiring auditors and directors re-elected.

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

War and the Inventor.

To the Editor, *South African Mining Journal.*

Sir,—In your issue of the 21st ult., there appears a letter from " A.E.R. " with regard to certain ideas he wishes to be investigated in connection with aerial navigation, and I should be glad if you would kindly ask him to communicate with the Secretary, South African Institution of Engineers, Dowell Buildings, Johannesburg, who will bring the matter to the notice of the Institution.—I am, etc.,

W. INGHAM, President,
S.A. Institution of Engineers.

Chamber of Mines and the South African Expeditionary Force.

To the Editor, *South African Mining Journal.*

Sir,—Referring to the two letters to you, dated respectively July 27th and August 10th, on this subject, in which it was stated that in all cases the situations of volunteers on active service with the Expeditionary Force who volunteer with the consent of their employers will be kept open for them, and that in the case of married men that half-pay would be paid to their dependants, I beg to inform you that the various Gold Mining Companies, represented on the Executive Committee of the Transvaal Chamber of Mines, have now agreed to pay unmarried men, without dependants, who have volunteered with the consent of their employers, quarter-pay, as an addition to the present Imperial rate of pay of 1s. per day, so long as that existing rate of pay continues. The J. B. Robinson Group of Companies are no longer members of this Chamber, and, therefore, the above undertaking as regards unmarried men without dependants does not apply to the companies in that Group.—We are, etc.,

J. GEMMILL,
E. L. R. KELSEY,
Joint-Secretaries.

Transvaal Chamber of Mines,
Johannesburg, 28th August.

ANSWERS TO CORRESPONDENTS.

" F.G.S."—From eight to ten years; but the increasing use of Main Reef may considerably prolong the life.

" Anxious " (Pretoria).—The quarterly report published in this issue answers your questions.

" G.H."—The mere sale of certain surface plant means nothing. When the money market is more favourable a restart will be made.

THE POSITION OF ZAAIPLAATS TIN.

Official Review of Recent Development.

The directors' report on Zaaiplaats mine for the quarter ended 31st July, 1915, shows that the mill ran on 91 days during the quarter, crushing 7,254 short tons, the duty per stamp being 10·6 tons per 24 hours. In addition 3,916 short tons of sand and slimes residues were re-treated, while 18,264 tons of overburden were dealt with by the alluvial plants. The output for the quarter amounted to 235 long tons of concentrates, assaying 68·3 per cent. metallic tin. The estimated profit for the quarter, excluding Government taxes and directors' fees, amounted to £10,099 14s. 3d., made up as follows:—Estimated profit for the three months' operations, £9,381 3s. 1d.; add adjustments of estimated values of previous shipments, £718 11s. 2d.; profit declared for the quarter, £10,099 14s. 3d. The average price per ton of metallic tin on which the above figures have been calculated is £159 19s. 7d. Mining.—*No. 13 Section*: The main ore body made a full recovery and continued normal throughout the quarter. The felsite dyke has been encountered in two branch faces, and in both cases the ore is being followed down along the dyke. This may be regarded as an encouraging feature. " C " branch, referred to in the previous report, has developed into a large average grade body with every indication of permanency. *Exploration.*—The old camp workings and No. 6 Roodepoort Section were re-opened during the quarter, the work in the latter being confined to the Company's own ground. Satisfactory developments are expected in both workings. In the Camp Working the Pegmatite Seam is being developed as a lode and encouraging results have already been obtained. *General.*— There is nothing of importance to report in connection with any of the other sections. During the quarter 9,377 tons of ore were mined and disposed of as follows:—Waste sorted, 2,408 short tons; sent to mill, 7,254 short tons—9,662 short tons; less taken from reserve, 285 short tons; total, 9,377 short tons. *Native Labour.*—The labour supply was ample for all purposes. *Water Supply.*—3·4 inches of rain fell on five days. The Sterk River, from which source the Company's supply of water is obtained, flowed with unusual strength for the season.

Kroonstad Coal Estate Co. Annual Meeting.

The annual general meeting of shareholders in the Kroonstad Coal Estate Company, Ltd., was held this week at the company's office, Cheapside, Kimberley. Mr. C. E. Nind moved the adoption of the directors' report, and the financial statement. He said that this had been a very trying year, and, as was naturally expected, seeing that the biggest war the world had ever seen was raging, the company had been materially affected, and unable to sell the usual quantity of coal. The principal supply, which was taken by De Beers C.M., Ltd., had not been wanted this year, and the company had sold very little coal. In 1914 they sold 87,913 tons, but in 1915, the year under review, the sale was only 12,103 tons, a shortfall of 75,810 tons; so they would readily realise how hardly they had been hit by the war.

Swaziland Tin, Ltd.

The following are particulars of the Swaziland Tin Company's output for the month of July, 1915:—Concentrates recovered, 36.994 long tons; estimated profit (taking the price of tin at £140 per ton), £979; to which must be added £161 (being adjustments in respect of previous shipments); total, £1,140.

Mine Safety, Sanitation, and Welfare Bulletin.

SAFETY MEASURES AT AMERICAN MINES.—II.*

[By HOWARD N. EAVENSON.]

AN ACCIDENT BONUS SYSTEM.

The class of men available for assistant mine foremen was not at first as good as was desired. The problem, as in all accident-prevention work, was one of education; and it was found somewhat difficult to convince some of the men, particularly the older ones, that the company actually meant "safety" to be the first consideration. In order to stimulate the interest of the assistant foremen in their work and to make the prevention of accidents a personal matter with them, a premium system was started in May, 1910, and has been, with some modifications found necessary, in effect since that time. Under this system, an assistant mine foreman having a clear accident record for a month receives a bonus of 5 dols.; should his record be free from accidents for six consecutive months, he receives a special premium of 10 dols. per month in addition to the 5 dols. already mentioned; and this bonus of 15 dols. per month is paid him as long as his record remains clear. Should he have an accident he is charged with demerits for each man who is injured under his charge each month at the rate of 10 demerits for each minor, 20 demerits for each serious, and 40 demerits for each fatal accident. No person having 10 or more demerits to his discredit at the end of each month is entitled to any premium, but if he has less than 10 demerits he will receive the same premium as before. In addition to the accident record, no person is eligible for a premium for any month in any position who has not worked in that position every working day but one during the month, unless he shall have been promoted during the month from one position to another and is eligible in both positions. The intention of this requirement is to make the foreman work regularly. A number of accidents have occurred while the regular foreman was not working and his substitute was not equally familiar with the conditions. The work of every man must be satisfactory to his immediate superior. If it is not so, the superior has the right to charge him with demerits at the rate of 10 per month. This is a disciplinary measure, but has been used very seldom. Any assistant foreman on whose section the company's mine inspector finds any dangerous practices or dangerous conditions which might cause accidents, is charged with five demerits for each visit at which such conditions are found. On the other hand, if no dangerous conditions or practices are found by the inspector and everything is satisfactory, the assistant foreman is given a credit of five merits; and each assistant foreman who does not have an accident during any month is given a further credit of five merits, which goes towards reducing the number of demerits standing against him, until all the demerits are cancelled, after which no further merits are given until he has again received demerits. The men are not permitted to accumulate merits, as this would have a tendency to make them more or less careless after they had accumulated a large number. The mine foreman is charged with all the demerits received by the various assistant foremen under him, and is credited with all the merits received by them. In the case of mine foremen, the premium for a month's clear accident record is 10 dols., and the special premium for six continuous months' clear record is 15 dols. Thus a mine foreman, having a clear accident record of longer than six months will receive a bonus of 25 dols. per month so long as his record remains clear, the assistant foreman, under the same conditions, receiving 15 dols. per month. This premium or bonus is not considered as a part of the wages, but is strictly in the nature of a reward for faithful services rendered to the company in the prevention of accidents. The mine foreman's account is not charged with any demerits of the assistant foreman when these are given for the neglect of duty or causes other than accidents. If a foreman or assistant foreman leaves the employ of the company, and later re-enters it, he assumes all demerits standing against him when he left. At the beginning of each month a statement is made showing the foreman and assistants at each mine, together with the number of demerits charged against them in the previous month, the number of demerits or merits received during the month, the number at the first of that month, the number of months' clear record, and the premium paid; and a copy of this statement is furnished each foreman and assistant foreman. This statement is looked forward to with a great deal of interest by the men, and if any error is detected in it the matter is at once called to the attention of the person in charge of this work. Since the adoption of the premium system in May, 1910, the company has paid 2,652 premiums, amounting to 19,005 dols., or a cost of 0·15 c. per ton. Since 1909, when the accident prevention work was really started and actively followed, the number of tons produced per fatality, both inside and outside, has risen from 107,323 tons to 428,962 tons (to November 1, 1914), and the production per fatal accident inside only has risen from 128,788 tons to 571,949 tons. The systematic timbering, and the fact that all headings and places on which more than one car in a trip passes have ample clearances on both sides, have been important factors in the reduction of accidents.

WORKMEN'S SAFETY COMMITTEE.

At each mine a safety committee of three workmen is appointed for a period of three months, and at least once in that time these men make a complete inspection of the mine and report any places which they find in dangerous condition, or make any recommendations they can toward the safety of the mines. These reports are forwarded to the general superintendent. Each month the general safety committee, composed of the general superintendent, chief engineer, and mine inspector, meets and considers all fatal or serious accidents which have happened during the preceding month, or any other accidents having any unusual features, and have before them, if possible, the victim or any witnesses to the accident, the assistant foreman in charge of the section on which the accident occurred, the mine foreman and the superintendent. The statements of these witnesses are heard, their evidence is weighed, and measures to prevent similar accidents are recommended. In cases of neglect on the part of the assistant foreman recommendations are made as to punishment. A stenographic report of these investigations is made for our files. Shortly after the first of each year, beginning in 1910, a meeting has been held, at which are present the general officials of the company and all of the superintendents, mine foremen and their assistants, and all outside foremen; the purpose of the meeting being to bring the assistant foremen into closer personal contact with the general officials than can be done in the ordinary course of business. After the inner man has been provided for, speeches are made by various members detailed for that purpose, about the best methods of preventing accidents or similar subjects, and ex-members of the staff, State mine officials, or other persons interested in the prevention of accidents are present, and give short discussions on subjects of interest. These meetings have undoubtedly been of great service in stimulating and maintaining the interest in safety work, and we believe they do more to impress the assistant foremen with earnestness in this work than any other single thing.

BULLETINS AND MOVING PICTURES.

In the case of any accident, a letter is prepared in the general office, giving, in a short manner, the details of the accident, and impressing upon the foremen and assistant foremen the lesson to be learned from this and the necessity of guarding against similar occurrences. A copy of this letter is sent to each mine, and posted on the bulletin board near the pit mouth. In case of serious or fatal accidents, the mining engineer visits the place, and, where necessary, a sketch is made showing the details of the working place, and prints of this sketch are also sent to each mine and posted on the bulletin boards. In case of fatal accidents, inspection is also made by the company's mine inspector, chief engineer, or general superintendent. At the beginning of each month a print is sent to each mine, on which is shown the number of fatal, serious, and minor accidents which have happened at each mine during the current year, and the number that have happened during the month just preceding. This print is posted on the bulletin boards, informing everyone at the mine of the number of accidents which have happened at all the mines and showing the relative standing of each one in this respect. At various times, when an accident of unusual nature or unusual interest has occurred, a circular letter is sent to the assistant foremen to be posted in their sections, calling their attention to the matter and warning them against similar occurrences. In addition to this, safety signs, many of which are illuminated, are placed in the mines and around the plants, and are changed from time to time in order to stimulate interest. Meetings of the assistant foremen, mine foremen, and superintendent are held each week at each mine, at which the general details of their work are discussed, and particularly any accidents which have happened and the steps which should be taken in their particular places to prevent similar occurrences. Last year, in co-operation with the United States Bureau of Mines, about 4,000 ft. of moving-picture film were taken, showing the complete details of the proper methods of mining. The object of these pictures was to show the miners exactly how the work should be done with safety and efficiency. These pictures have been exhibited at each of our different works a number of times; and it is our intention to repeat the exhibition from time to time, in order that any new men coming in may be thoroughly posted. The class of men engaged in most mines, and, in fact, almost all men, can learn a great deal more through the eye by means of pictures of this sort than they can through printed or written instructions; and this film has been of great benefit in improving the efficiency and safety of our methods. Anything that tends to promote the efficiency of mining will undoubtedly, in the long run, promote its safety; and the safest mining will undoubtedly prove to be the most efficient. Accident prevention is, as has been said, very largely a question of education; and our experience has been that the great majority of men are willing to take the precautions their experience, or knowledge, has taught them to be necessary, and that they appreciate the efforts being made by their employers to prevent accidents of all kinds. The great question is to reach the man who is actually doing the work at the working face with the superior knowledge and experience of the higher officials, and this can only be done by a system of detailed supervision and instruction through bosses having the necessary time to see that dangerous conditions are removed promptly. When the man at the face learns to carry out instinctively the directions given in the rules formulated for his benefit, the accident rate will not exceed one-fourth of the present one. Any work of this kind requires unceasing vigilance, careful supervision, and the never-ending stimulation of the spirit of care in all those having anything to do with it.

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*From a paper on "Safety Methods and Organisation of United States Coal and Coke Company," read before the American Institute of Mining Engineers.

Rhodesian Section.

RHODESIAN MINERAL OUTPUT FOR JULY.

Official Returns of Gold and Other Minerals from Southern Rhodesia for the Month

We have received for publication from the office of the Rhodesia Chamber of Mines, Bulawayo, the following detailed statement of the mineral output for the month of July, 1915, with comparisons and values:—

MATABELELAND.

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Bulawayo District—				
Abercorn (W. J. Lane)	5	205	96·57	400
Agincourt (Hogg & Co.)	5	297	158·61	658
Alluvial (G. W. Anderson)	—	—	·78	3
Anderson's (Est. R. Barkley)	10	512	31·47	130
Antelope G.M. (Rhod.), Ltd.	2T 2B 2P	4,194	961·85	3,987
Do. (slimes)	—	3,860	1,192·49	4,944
Antenior (W. J. Lane)	(5)	252	66·03	274
Basch (Morrison & Granger)	5	500	94·08	390
Do. (sands)	—	420	52·88	219
Bassick (Bassick Mine Syndicate)	5	80	51·68	214
Do. (sands)	—	120	14·98	62
Bessie East (T. Berwitz)	2	120	26·60	110
Big Ben (W. E. Hunt)	4	210	72·80	302
Blanket (Blanket Syndicate)	15	1,272	154·79	642
Blue (J. Eisenhammer)	2	280	20·34	84
Bon-Accord	D	—	33·02	137
Bulawayo Main (Aserman and Cormack)	2	164	39·34	163
Bunny's Luck (W. H. Rabbetts)	2	109	134·10	556
Camp (Carson Mines, Ltd.)	5	546	139·91	580
Do. (sands)	—	490	86·13	357
Carry (Boomerang Syndicate)	1H	210	119·11	494
Do. (sands)	—	200	28·58	118
Cecil (Master Cecil Syndicate)	3	25	27·04	112
Claremont (sands), T. J. McFarlane	—	1,134	53·46	222
Coquette (W. H. Robinson)	2	152	38·35	159
Cottage (Cottage Syndicate)	4	340	100·79	418
Do (sands)	—	182	21·32	88
Donore A. (W. K. Early)	3	15	97·56	404
Durban (Durban Syndicate)	2	220	112·28	465
Do. (sands)	—	135	46·01	191
Eagle A. (Macdonald & Co.)	10	843	320·76	1,330
Do. (sands)	—	360	38·64	160
Edward (Warren & Guest)	5	430	104·06	431
Elnmba A. (E. W. Bosomworth)	5	600	156·70	650
Do. (sands)	—	550	125·94	522
Farvic (H. S. Henderson)	5	749	379·49	1,573
Do. (sands)	—	466	31·80	132
Feruando (Transvaal & Rhodesian Estates)	10 2P	700	334·69	1,387
Do. (sands)	—	700	81·17	337
Float (W. A. Foster)	2	38	18·29	76
Fred (Transvaal & Rhod. Estates)	(10)	1,050	276·80	1,147
Do. (sands)	—	1,050	89·82	372
Germania (A. G. Hadingham)	2	194	76·82	318
Godwin B. (Barrett & Stacey)	5	237	203·20	842
Hildata A. (R. Aserman)	5	682	63·08	261
Do. (sands)	—	341	36·92	153
Intabanenda (Intabanenda Synd.)	5	520	178·16	739
Do. (sands)	—	430	44·76	185
Jeffs (Horton & Stewart)	3	115	132·24	548
Jumpers (J. P. McCay)	5	450	109·36	453
Do. (sands)	—	270	66·06	274
Kernel (E. Farrar)	5	400	122·57	508
Do. (sands)	—	220	31·58	132
Kitty (D. G. Davies)	1 H	50	12·59	52
Lewgran (E. Basch)	5	400	71·24	295
Liberty (Liberty Synd.), clean-up	—	—	23·42	97
Do. (sands), clean-up	—	—	29·04	120
Lone Hand (Armstrong & Furber)	5	407	181·86	754
Do. (sands)	—	268	43·75	181
Lonely Reef G.M. Co., Ltd.	20 3T	4,780	659·10	2,732
Do. (slimes)	—	4,780	2,569·98	10,654
Lonely Star (E. K. Jubber)	5	72	11·34	47
Lucknow (C. F. McNamee)	3	240	117·84	489
Margaretta (Smith & Bowley)	4	82	32·69	136
Matabele 3 (Criteriou G.M., Ltd.)	10	1,336	157·06	651
Do. (sands)	—	620	14·56	60
Matabele Queen's Co., Ltd.	10	1,830	427·35	1,772
Do. (sands)	—	1,830	384·09	1,592
Mayfair (Hicks & Arbery)	5	550	83·89	348
Do. (sands)	—	330	11·74	49
Nelly (F. D. Roscoe)	3 H	700	642·40	2,663
Do. (sands)	—	330	163·18	677
New Eclipse (J. R. Stewart)	5	515	158·71	658
Nicholson (Cunningham & Allison)	10 1C	1,025	111·65	463
Northern Star (N. Star Syndicate)	10	441	120·88	501
Do. (sands)	—	315	10·53	44
Oland (C. A. Hakanson)	2	121	47·02	195
Old Nic (Chart. & Gen. E. & F. Co., Ltd.)	15 4P	2,317	570·07	2,363
Do. (sands)	—	1,312	148·95	617
Olympus (Birthday Synd.), sands	—	2,400	78·60	326
Princess 2 (C A. Abbott)	2	105	37·12	154
Do. (sands)	—	170	8·76	37
Queens West (Cummings & Berry)	3	130	40·78	169
Do. (sands)	—	460	64·16	266
Sabi Extra (J. Cook), June & July	3	50	119·91	497
Slope I. (E. E. Beecroft)	5	823	146·32	607
Stella (J. L. Henderson)	2	400	176·29	731
Thanet (Skinner & Sneddon)	2	90	14·97	62
Union (P. Schwirner)	1 H	258	50·65	210
Winifred (Exchange Syndicate)	5	578	93·61	388
Woolley Dog (P. H. Davis)	2	354	647·51	2,684
Bulawayo district total			15,379·47	63,754
Gwelo District—				
Alderman (Williams & Woodger)	3	150	67·50	280
Ardpatrick (J. E. & F. Maleham)	3	320	97·09	407
Bedad (A. & B. Syndicate)	5	252	36·14	150
Do. (sands)	—	660	60·80	252
Bell Reef Dev. Co., Ltd.	2B 1T	3,078	1.202·44	4,985
Bonsor B323 (Cornish Syndicate)	15	1,163	246·75	1,023
Do. (sands)	—	1,050	69·95	290
Bonsor B327	10	750	98·36	408
Britton (H. Moore)	1 H	—	10·90	45
Cactus (Renton & Gray)	5	432	62·92	261
Do. (sands)	—	416	50·13	208
Camelia (S. Levin)	10	1,510	404·60	1,677
Do. (sands)	—	620	31·82	132
Cissy (G. Nicholson)	1 H	282	53·00	220
Collingwood (Pini & Wearing)	5	480	31·92	132
Do. (sands)	—	560	43·49	180
Csardas (Wolfshall Syndicate)	10	702	503·02	2,085
Do. (sands)	—	510	122·51	508
Do. (slimes)	—	192	28·80	119
Dream (Dream Trib. Syndicate)	5	160	25·15	104
Eileen (M. L. Price)	5	300	24·41	101
Emerald (Boston & Flann)	2	670	76·00	315
Falcon Mines, Ltd.	22 2T	13,147	2,978·33	12,509
Do., copper, £15,249.				
Gaika G.M. Co., Ltd.	5 1C	3,300	1,561·40	6,558
Do. (sands)	—	1,438	81·82	344
Do. (slimes)	—	2,080	138·17	580
Glen Hume	5	730	110·84	459
Glen Rosa (Glen Rosa Syndicate)	5	630	915·44	3,795
Do. (sands)	—	420	229·96	953
Globe & Phoenix G.M. Co., Ltd.	40 10P	6.288	5,707·29	23,971
Do. (sands)	—	5,641	1,045·12	4,389
Do. (slimes)	—	2.216	392·80	1,650
Do. (concentrates)	—	290	382·80	1,680
Gothic & Pagamesa (W. H. Peard)	15 2P	973	282·80	1,197
Do. (sands)	—	515	77·52	321
Guineafowl (H. R. Cumming)	—	—	1·34	6
Jester (A. E. West), June	5	170	14·74	61
Leopard (Leopard Trib. Syndicate)	5	710	114·82	476
L'Espoir (W. B. Harrower)	5	90	11·81	49
Moss (W. M. James)	9	986	487·67	2,022
Do. (sands)	—	480	38·53	159
Nantwich (B. Fran), June and July	3	76	71·00	294
New Dunraven G.M. Co., Ltd.	5	900	199·52	827
Do. (sands)	—	700	29·42	122
Pompei (Bolt & Franks)	5	610	53·90	223
Do. (sands)	—	580	12·99	54
Poudo (F. C. Luxat), June	5	680	154·66	641
Do. (sands)	—	280	24·02	100
Do., July	5	540	277·21	1,140
Do. (sands)	—	280	56·17	233
Redhill (H. E. Browne), May	1 C	645	17·12	71
Do. (sands)	—	160	14·78	61
Do. (sands), June	—	450	17·63	74
Do., June	—	630	13·05	54
Do. (sands)	—	155	15·26	63
Romney (T. Pedlow)	5	294	79·15	328
Second Trial (J. Rainsford)	3	70	8·37	35

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Selukwe-Columbia G.M. Ltd.:				
Danga	10 1P	214	58·72	236
Do. (sands)	—	107	13·06	54
Wonderland	—	1,118	390·26	1,625
Do. (sands)	—	566	89·81	372
Yankee Doodle	10	1,522	253·59	1,051
Do. (sanda)	—	1,002	113·65	471
Surprise (Bolt & Franke)	—	—	14·19	59
Tebekwe I. (A. N. Tyrrell)	20	2,510	327·49	1,358
Do. (sands)	—	1,600	147·37	611
Trepolpen (C. T. Uren)	2	27	8·48	35
Veracity (L. R. Evans)	2	230	99·31	412
Wanderer (Selukwe) G.M., Ltd.	4 GR	12,044	1,231·68	5,106
Zabonkwe (Holmes & Urquhart)	5	840	65·26	271
Do. (sands)	—	589	115·92	480
Gwelo district total			21,899·96	91,459

Matabeleland total .... 37,279·43 ozs.
Value £155,213

MASHONALAND.

Hartley District—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Arlandzer (Keir & Rooke)	10	1,700	112·98	469
Do. (sands)	—	1,700	241·16	1,000
Baltimore & Virginia	5	360	35·25	146
Bijou (G. Hawkins)	—	175	118·70	492
Brilliant (Mabel's Lnck Syndicate)	5 1P	854	179·55	744
Do. (sands and slimes)	—	851	104·52	433
Bonheur (T. H. Long)	2	25	43·82	182
Brompton (R. R. Aitken)	5	800	135·27	561
Do. (sands)	—	600	42·43	176
Buffalo (E. A. Begbie)	5	300	79·27	329
Cam and Motor G.M. Co., Ltd.	—	13,096	4,943·65	20,961
Concession Hill & W. Ext. (C. E. Simpson)	5 1C 2P	1,900	309·26	1,282
Do. (sands)	—	1,000	66·05	274
Dalny (Macdonald & Sale)	1 C	1,335	69·21	267
Do. (sands and slimes)	—	1,318	179·98	746
Dalny 1 W. (Macdonald & Sale)	5	500	72·88	302
Do. (sands)	—	300	27·27	113
Dawn (Arrow Syndicate, Ltd.)	5	734	312·92	1,285
Do. (sands)	—	964	29·97	124
Dreadnought	1 C	200	40·57	168
Eiffel Blue (Willoughby's Cons. Co. Ltd.)	10	1,357	541·22	2,244
Do. (sands)	—	780	38·30	159
Eileen Alannah Mining Co., Ltd.	12 2T	3,722	645·94	5,376
Do. (sands)	—	4,601	1,296·94	5,376
Enney Ext. (E. G. Goodyer)	5	537	172·82	716
Do. (sands)	—	340	54·75	242
Giant Mines of Rhodesia, Ltd.	30 2T	5,907	1,111·24	4,571
Glasgow Mines, Ltd.	5	536	93·96	389
Do. (sands)	—	252	31·80	132
Glasgow I. (R. McInnes)	—	180	48·44	201
Glencairn (Glenrosa Mines, Ltd.)	5	870	1,233·42	5,113
Golden Valley (J. Mack)	10	1,284	590·79	2,449
Do. (sands)	—	718	127·85	530
Guelph (J. & M. Davidson)	3	135	37·00	151
Inez (Harrill & Smith)	10	1,430	164·95	684
Do. (sands)	—	670	31·24	129
Iron Mask (A. F. Johnston)	5	311	37·23	134
Do. (sands)	—	311	18·75	77
Jess	2	80	21·32	88
Kanyemba (Kanyemba Syndicate)	10	1,064	467·82	1,939
Do. (sands)	—	682	119·03	493
Kitty (A. Buchanan)	5	90	20·85	86
Last Lap (J. Buchanan)	5	70	15·86	66
Masterpiece (J. McAdams)	5	507	203·59	844
Mudale (E. A. McDowell)	5	450	185·01	767
Old Chum (W. H. Halkett)	5	420	75·13	311
Do. (sands)	—	400	40·41	168
Oleander (O. T. de Villiers)	3	600	158·23	656
Owl (A. Rolfe)	10	1,502	793·77	3,291
Do. (sands)	—	1,620	498·00	2,064
Pickstone Gold Mines, Ltd.	10	2,683	201·07	833
Do. (sands and slimes)	—	1,610	200·78	832
Poverty (D. J. Laing)	5	800	237·86	986
Do. (sands)	—	500	9·20	38
St. George (Hussey & Fraser)	2	80	69·03	257
St. Louis (Smith & Heard), June	3	51	55·96	232
Seigneury (Seigneury Syndicate)	10	1,102	196·27	814
Do. (sands)	—	850	29·32	121
Seven Sisters (7 7's Syndicate)	3	280	40·19	167
Shepherds (Phoenician (Rhod.) Co., Ltd.)	5 1T	980	269·63	1,118
Do. (sands)	—	980	214·13	888
Thistle-Etna G.M., Ltd.	1 C	3,057	581·62	2,414
Do. (sands)	—	2.814	120·88	502
Victoria 1 (Crown Syndicate)	4	110	14·71	61
Do. (sands)	—	100	10·51	43
Village Main (Bruce & Buchanan)	5	360	69·97	290
Washington (I. J. Minnaar)	5	405	51·20	212
Do. (sands)	—	300	19·52	81
What Cheer (H. Moser)	5	395	302·45	1,254
Do. (sands)	—	625	143·48	596
Hartley district total			18,350·71	78,559

Lomagundi District—

	No. of stamps.	Tona treated.	Yield. ozs.	Value. £
Alluvial (P. L. Aitchison)	—	—	12·20	51
Alluvial (N. Griffin)	—	—	10·26	43
Colorado (Diggers Syndicate), sands	—	398	30·97	128
Eldorado Banket G.M. Co., Ltd.	20 1C 4P	4,053	1,630·17	6,847
Do. (sands)	—	3,920	788·60	3,312
Golden Kopje Prop. Mines, Ltd.	50 2T	12,020	420·09	1,764
Do. (alimes)	—	11,870	1,657·65	6,962
May (May Syndicate), June	5	330	62·19	258
Do. (sands)	—	210	50·58	210
Do., July	—	340	22·70	94
Do. (sands)	—	240	32·79	136
Maybe (A. Coleman)	5	60	18·75	78
Lomagundi district total			4,736·95	19,882

Mazoe District—

	No. of stamps.	Tona treated.	Yield. ozs.	Value. £
Botha H. (London and Rhodesia Mining and Land Co.)	1 H	2,980	30·30	126
Do. (sands)	—	930	32·94	137
Cheza (Goldrick & Mangan)	2	120	31·57	131
Chia (Arrow Syndicate, Ltd.), sands	—	781	101·48	421
Day Dawn (Day Dawn Tribute)	2	203	62·06	257
Do. (sands)	—	217	42·41	176
Goth B. (Currell & Cooke)	4	500	60·44	251
Jumbo G.M. Co., Ltd.	20	1,900	492·43	2.041
Do. (sands)	—	1,250	71·55	297
Do. (slimes)	—	650	62·50	259
Kingsley Hoard (June)	5	383	75·58	313
Do. (July)	5	191	27·15	113
Kimberley (Mash.) G.M. Co., Ltd.	8 2T	4,400	807·22	3,423
Do. (sands)	—	2,150	282·73	1,199
Do. (slimes)	—	2,250	284·31	1.206
Mainstay (June)	2	40	14·14	59
Do. (July)	—	50	26·27	109
Micky (Micky Syndicate)	2	427	108·07	448
New Darwin (Howard & Southey)	2	280	80·78	335
Ravine H. (Q. H. Whiteford)	2	200	45·85	190
Rhino (Giles & Southey)	2	300	43·83	182
Rosemont (Rose & Cooke), tailings	—	—	4·18	17
S.D.C. 3 E. (B. G. Byerley)	1 H	694	66·30	275
Tat (W. M. Epton)	5	460	126·03	522
Do. (sands)	—	297	12·47	52
Xmas (B. B. & P. Syndicate)	1 C	300	45·32	188
Mazoe district total			3,038·11	12,725

Salisbury District—

	No. of stamps.	Tona treated.	Yield. ozs.	Value. £
Alpes (P. Zaffere)	5	304	155·49	645
Do. (sands)	—	450	85·50	354
Arcturus (L. Chiappini), sands	—	600	112·49	466
Ceylon (Ceylon Syndicate)	5 1P	914	203·23	842
Do. (slimes)	—	914	148·83	617
Cross-your-luck (Seb. & Dist. Mines)	2 1P	152	44·20	183
Do. (sands)	—	494	103·13	428
Found A. (Grey's Syndicate), June	2	100	83·22	345
Do. (sands)	—	300	86·60	359
Do. (July)	2	160	102·90	427
Do. (sands)	—	160	49·35	205
Inyague 3 (P. L. Peters)	2	60	37·06	154
Joking (Harrison & Drabble)	2	245	222·88	924
Do. (sands)	—	230	60·81	252
Koodoo (Est. R. Tyron), Juue	5	638	132·55	549
Koodoo (Est. R. Tyron), July	—	517	127·91	530
Louise Grand (H. S. Plant)	1 H	750	28·62	119
Do. (sands)	—	949	38·51	160
Do. (July)	—	960	92·19	382
Do. (sands)	—	960	39·91	165
Mont d'Or	5	260	193·82	803
Mnllingar (J. H. Hall), clean-up	—	—	42·72	177
New Full Back (N.F.B. G.M. Syd.)	2	240	33·79	140
Old Loyalty (Shamva Ilex G.M. Co., Ltd.)	5	285	157·81	654
Do. (sands)	—	—	68·63	284
Olympus (B. Peridis)	10	420	76·20	316
Planet (Planet Tribute Syndicate)	10 1P	1.204	320·01	1,327
Do. (sands)	—	1,204	292·10	1,211
Radnor I. (London & Rhodesia Mining and Land Co.)	5 2P	1,157	282·23	1.170
Shamva Mines, Ltd.	56 8T	50,207	3.138·01	13,180
Do. (sands)	—	22,531	2,734·88	11,486
Do. (slimes)	—	26.787	3.250·84	13.654
Southern Cross (H. G. Bateman)	1 D	33	19·50	81
Sparti (Sparti Syndicate)	—	—	8·48	35
Salisbury district total			12,574·40	52,624

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
UMTALI DISTRICT—				
Birthday (P. M. Branken)	3	28	5·01	21
Champion 193 (J. Buchanan)	5	1,490	77·25	320
Do. (sands)	—	760	61·50	255
Constance (J. F. Kapnek)	5	750	76·79	318
Do. (sands)	—	360	7·17	30
Golden Frog (W. A. Hoole)	1 C	215	23·59	98
Grand Manika (Grand Manika Sd.)	1 H	250	22·52	93
Do. (sands)	—	250	5·79	24
Inca (F. Young)	5	290	54·13	224
Liverpool (R. G. Snodgrass)	5	780	97·27	403
Do. (sands)	—	320	73·28	303
Montezuma G.M. Co., Ltd.	10 1P	1,014	222·53	923
Perthshire	10	600	417·96	733
Do. (sands)	—	450	79·60	330
Pilgrim 2E. (O. B. Cawood)	10	800	66·81	277
Do. (sands), E. K. Evans	—	1,600	36·84	153
Rezende Mines, Ltd.	60	10,200	1,290·32	5,475
Do. (sands)	—	3,226	280·66	1,190
Do. (slimes)	—	1,282	135·16	573
Do. (concentrates)	—	140	472·79	1,190
Sarmbi (D. Tulloch)	5	44	5·04	21
Umtali district total			3,512·01	14,754
VICTORIA DISTRICT—				
Empress (S.A. Pros. and Con. Syndicate)	8	1,373	212·64	881
Do. (sands and slimes)	—	765	157·60	654
Ruby (E. Frankis)	5	110	15·62	65
Sunbeam (Douglas & Durrell)	—	605	270·58	1,122
Wake Up, John (J. S. Hemlock)	2	42	21·09	87
Victoria district total			677·53	2,809

Mashonaland total	43,389·71 ozs.
Value	£181,353
Grand total	80,669·14 ozs.
Value	£336,566

C: Chilian Mill. T: Tube Mill. G.R: Gates Roll. H: Huntington Mill. P: Grinding Pan. Pn: Pneumatic Mill; D: Dolly.

TOTAL MINERAL OUTPUT.

	Ounces.	Value.
Gold, ounces	80,669	£336,566
Silver, ounces	16,214	1,431
Copper, tons	330·23	16,511
Coal, tons	35,823	11,057
Chrome iron, tons	5,432	12,125
Asbestos, tons	64·35	1,030
Lead, tons	3·31	68
Diamonds, carats	33	102
Grand total value,		£378,890

GOLD OUTPUT COMPARISONS.

	Ounces.	Value.
July, 1915	80,169	£336,566
July, 1914	76,687	320,670
Increase	3,482	£15,896
July, 1915	80,169	£336,566
June, 1915	77,269	322,473
Increase	2,900	£14,093

Grand total output todate.—Gold, 7,777,914 ozs., value £31,015,759; silver, 1.969,957 ozs.; lead, 7,085 tons; copper, 3,326 tons; chrome iron, 355.458 tons; coal, 2,178.603 tons; tungsten ores, 129·10 tons; antimony, 13·75 tons; arsenic, 76 tons; asbestos, 2.224 tons; diamonds, 10,662·25 carats; other precious stones, 90,069·50 carats.

Mr. H. Ewer Jones, A.R.S.M., M.I.M.M., is on his way to Rhodesia to make, on behalf of the Amalgamated Properties of Rhodesia, the further inspection granted by the Court of the Globe and Phœnix mine.

Coal and Labour.

The coal and labour return for the Natal Province for the month of July, 1915, is as follows:—

	Average labour in service. Total.	Coal mined. Tons of 2,000 lb.
Dundee Coal Co.	2,032	33,983
Hlobane	1,152	32,485
Natal Navigation	1,402	29,048
Durban Navigation	878	24,184
Glencoe (Natal)	998	14;739
Hatting Spruit	479	11,999
Utrecht	602	9,800
South African	669	9,294
Natal Steam	374	8,085
Elandslaagte	523	7,683
Ballengeich	427	6,911
Natal Cambrian	524	5,959
Wallsend (Natal)	250	5,517
Newcastle	301	4,564
Fairleigh	284	4,400
Natal Ammonium	47	1,028
Vryheid Coke Co.	68	700
Dewar's Anthracite	63	600
Avon Collieries	16	394
Totals	11,089	211,373
Corresponding month in 1914	13,195	234,714

The coal bunkered and exported through Durban was:

	Tons. 2,000 lb.
Bunker coal	68,875
Coal exported:—	
Oversea	20,750
To Union ports	17,588
Total	107,213

Sakalava Madagascar Proprietary Oil Fields.

The Secretary writes:—" We have this day received the following cable from our Oil Fields Manager, viz.: Number 3 well, 1,550 feet deep, formation sandy lime, indications good, show gas oil."

Increase in Aluminium Production.

Mr. Nicolas Flamel, in the current issue of *La Nature*, deals with the great increase of the world's production in aluminium during the last few years, and comes to the conclusion that the enormous expansion is due to the steady but secret preparations for war made for several years past—asd especially during the past three years—by Germany and Austria. The Austro-Germans use aluminium for the purpose of manufacturing fuses for their shells, for purposes of field equipment (cooking utensils) and for Zeppelins. Mr. Flamel concludes a careful study of aluminium statistics by the following remark: "The above study of the statistics of imports of aluminium into the Central Empires during the last few years leads to the deduction that ever since the Conference of Algeciras they have been hastily preparing for war. With this object they have bought huge quantities of aluminium, passed it through their factories, or held it in reserve, for their artillery. There are no such reserves of aluminium as of copper, which has accumulated for centuries, because this metal (aluminium) is comparatively new, and the methods of preserving it are still, in practice, very doubtful as to results. Moreover, the Germans have no bauxite, nor any important factories for the production of aluminium."

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MANAGERS - - - January and May - ALL Passed.
ELEC. ENGINEERS - February - - - - - 66% ,,
MECH. ENGINEERS - June (Kimberley Centre) - - ALL ,,
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METALLURGICAL PRACTICE ON THE RAND.—VI.*

[By F. L. BOSQUI, lately Chief Consulting Metallurgist to the Rand Mines-Central Mining Corporation.]

CLASSIFICATION.

The necessity of providing a specially thickened and classified pulp for tube mills gave fresh impetus to the study of classification, which hitherto had been chiefly confined to the rather crude methods in vogue of separating sand from slime. The earliest classifiers were of the inverted pyramid type, a first series of spitzlutten with small pockets being designed to eliminate the coarse sand and concentrate, which were collected and given a special treatment, and a second series of much larger pockets being used for separating sand from slime. A further separation of sand and slime took place in the sand collectors, the overflow of which passed to a series of return-sand spitzkasten for the further elimination of sand, the final overflow product from the latter going to the slime plant. When tube mills were introduced in 1904, the coarse product was no longer separately collected but run to these mills; and the apparatus for classification gradually took the form of a simple series of spitzkasten, provided with underflow nozzles of different apertures. This underflow passed to the tube mills, while the overflow went direct to the sand collectors, in which the slime was separated from the sand and discharged by means of adjustable overflow weirs into so-called return-sand classifiers, which in turn discharged their overflow to the slime plant. The first step in the much-needed improvement in classification was taken in 1908, when Messrs. Caldecott and Smart developed what is known as the diaphragm cone, now generally employed for thickening and classifying tube-mill pulp. This consists of a sheet-steel cone, 5 to 6 ft. in diameter and 7 to 9 ft. deep, provided near the apex with an iron disk or diaphragm. This disk is 8 to 10 in. in diameter, and the annular space between it and the sides of the cone is 2 to 2½ in. The proper action of this diaphragm is obtained only when the cone is full of solids. The mass of sand in the cone then assumes a concave surface, the deepest point from the plant of the overflow edge being immediately under the central pulp inflow. At this point, where the coarsest and heaviest product accumulates, the surface is seen to be in a state of slow continuous subsidence. This slowly subsiding mass of heavy material, conceivably irregular or conical in shape, may be presumed to act as a descending wedge, retarded in its downward course by the supporting diaphragm; while the finer sand, with the slime, tending to adhere to the sides of the cone, would appear to be literally pushed aside and crowded upward by the central column, so reaching the overflow rim and escaping. The slow, thick stream issuing from the apex carries only from 26 to 30 per cent. moisture, and a minimum of the fines which it is desirable to exclude from the tube mill. These cones have a large capacity, and, barring the one disadvantage of vertical height required, may be considered the most simple and suitable means yet devised for providing all the conditions requisite for a tube mill feed that will enable the mill to work at highest efficiency. This device is now used either as the sole means of classifying mill pulp, or in conjunction with hydraulic classifying cones. An important aspect of this innovation was its having made possible the introduction, in 1907, of the Caldecott sand-filter table, a device whose success obviously depended upon securing a suitable thickened pulp, containing a small amount of water and a minimum of slime. The primary object of this appliance, as explained by the inventor, was to obtain sand in such a condition for treatment as would warrant the elimination of sand-collecting vats, which could then be used for treatment purposes. Obviously, the effect of this was to increase very considerably the capacity of a leaching plant. Metallurgically considered, however, the significant feature of this appliance was its revival of the old question of the possibility of single treatment of sand after proper classification. In this connection it is interesting to note a prediction made by Charles Butters in 1895, that "the whole question of double treatment really resolved itself into a matter of filling the vats with clean stuff, and he was confident that the day would come when there would be no double treatment." The first notable success in America in collecting and treating sand in the same vat was at the Homestake mill; but in Africa, with the single exception of the East Rand Proprietary, double treatment has been retained until quite recently. In 1910, when the new plant for the Modderfontein B. mine was being designed, I undertook to evolve a simpler method than the filter table for obtaining a clean sand, with a view to the subsequent elimination of separate collecting tanks. This classifying plant consists of eight small primary hydraulic cones, 2ft. 9in. in diameter and 2ft. 6in. deep, designed as concentrators for insufficiently ground sand particles from the tube mills. The overflow from these gravitates to four larger hydraulic cones, 8ft. in diameter by 6ft. 9in. deep, which effect a very satisfactory separation of sand from slime, the overflow gravitating direct to the slime collectors. The underflow of the large cones is evenly distributed in the collectors by the Butters and Mein distributor, a device recently revived on the Rand Mines group after several years of disuse. This system, in view of the possibility of treating a considerable amount of fine (−200) sand in the Butters filter, was found to be well adapted to this mode of filtration, the correct proportion of fine sand and slime being easily obtainable. Moreover, an evenly distributed sand charge was secured, free from lumps and layers of slime. This system has been adopted by other mines of the Rand Mines group; and in newer plants has, with a few modifications, superseded the primitive method of charging sand snd slime together into collectors and depending upon a Kaffir and a movable hose for even distribution.

At the Crown Mines an improved hydraulic attachment for cone classifiers was devised by H. Brazier, the reduction foreman at "C" mill. This consists of an adjustable nozzle for discharging water in proximity to the apex of the classifying cone in the form of a thin circular sheet, directed horizontally between the nozzle and the cone. By means of this system of cone separators the classification of sand is permissible within a wide range, and has enabled us to obtain a charge of sand so permeable and uniform that after practical trials the separate sand collector is now recognised to be superfluous, and will be omitted in forthcoming plants to be erected by the Rand Mines Group. We have then at the present time on the Rand two very satisfactory methods for classifying sand, (1) the Caldecott sand-filter table, and (2) the system of hydraulic cones just described. The former possesses the advantage of delivering a solution-borne sand to the treatment tank, and so shortening the time of treatment and increasing the capacity of existing plants, which is a very desirable thing, especially where the saving of capital outlay is imperative, as at the City and Suburban, where the sand-filter table obviated an expensive and awkward extension of plant. But for new mills adopting single treatment of sand the indirect saving in sand plant would appear to be offset by the lower initial expense of the hydraulic-cone system itself, the small amount of attention required, and its negligible cost of maintenance and operation, as compared with the filter table. An improved arrangement of the two series of cones was shown. Differing from general practice, the slime separators are placed near the ground, only just high enough to permit their overflow to run to the Dorr thickeners, while the overflow of sand is elevated to the sand-treatment tanks. We thus have but two lifts in this type of plant; the first, and highest, elevating the tube-milled pulp to the primary classifiers, and a much shorter lift elevating sand and water only.

TREATMENT BY CYANIDE.

It was only after the introduction of the cyanide process that the distinctive terms "sand" and "slime" came into common use. In the early days of cyaniding the bugbear was slime, or the unleachable, finely-divided portion of the mill pulp, which the mill man endeavoured to avoid making, in order to secure as large a proportion as possible of leachable sand. Until a method of treating slime was devised, this product was impounded in dams. These accumulations have now mostly been treated. When the decantation process made it possible to deal with current slime direct from the stamp mill, the production of the latter was no longer avoided. Until vacuum filtration was introduced, the slime represented between 30 and 40 per cent. of the total product of crushing; but this proportion has gradually increased with the progressive improvements in treatment, until now as high as 60 per cent. of the pulp is treated as slime. We may say, therefore, that tube mills, improved classification, and the vacuum filter have made possible (1) the treatment of a greater proportion of slime than formerly, which has improved the total extraction, and reduced the cost of treatment, since slime can be more cheaply treated than sand; and (2) the treatment of more finely crushed sand, with consequent improvement in extraction. In the best plants, a recovery of 90 per cent. of the gold from sand and 93 per cent. from slime is now being obtained, or a total recovery of 96 per cent., which is probably the highest extraction economically attainable on the Rand. The metallurgist in Johannesburg to-day is therefore chiefly concerned with those improvements in appliances, general technique, and administration which, in view of the much reduced grade of ore, will minimise cost of treatment.

(To be continued.)

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* Paper read before the American Institute of Mining Engineers.

We have to acknowledge receipt of a copy of a special "Rosh Hashona" number of the "South African Jewish Chronicle." The work, which is excellently produced, is on sale at any branch of the Central News Agency, or may be obtained, post free, from P.O. Box 20, Johannesburg, for the moderate sum of 1s.

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THE WATER SUPPLY OF THE RAND.—VI.

[By W. **Ingham**, Chief Engineer, Rand Water Board.]*

Vaal River Scheme.

On the 26th September, 1913, the Rand Water Board decided to present a Bill to the Union Parliament for the right to impound from the Vaal River a quantity of water sufficient to provide for a supply of 20 million gallons per day, and to amend in certain respects the Rand Water Board Statutes of 1903 and 1906 (Transvaal) and the Rand Water Board Further Powers Act of 1909 (Transvaal). The Bill was passed early in June, 1914, and is designated as Act No. 18 of 1914. The estimated cost of the new scheme is £1,250,000, of which £1,146,707 is for engineering. This scheme was selected by the Board from 21 large schemes estimated to cost £25,338,926. The estimated working costs per 1,000 gallons is 4·376 pence, and the fixed charges 4·589 pence per 1,000 gallons, or a total of 8·965 pence per 1,000 gallons pumped to the Rand. The figures given above refer to the Vaal River Scheme alone, and must not, therefore, be taken to have any reference to actual cost to consumers, in view of the fixed charges on the Board's existing loan of £3,400,000 which will not be redeemed until the 31st March, 1935. The Vaal River figures are based on an assumed quantity of ten million gallons per day being pumped. The reservoir is designed to impound sufficient water to give a constant supply of 20 million gallons per day, but the financial powers taken under the Act are sufficient only to provide for bringing into service a first supply of ten million gallons per day. A few of the principal particulars of the scheme are given below:—

Site of barrage: 23½ miles downstream of the Vereeniging Railway Bridge.
Number of gates: 36.
Width of gates: 30 feet.
Depth of gates: 25 feet.
Depth of reservoir: 25 feet 1 inch.
Original depth of reservoir: 23 feet 3 inches. (This was increased to 25 feet 1 inch during the passage of the Bill through Parliament.)
Additional depth allowed for riparian owners: 1ft. 10in.
Quantity allowed for riparian owners: 1,800 million gallons.
Contents of reservoir when full: 13,633,000,000 gallons.
Evaporation from reservoir after allowing for rainfall and reduced area of reservoir during portion of year: 3,382,000,000 gallons.
Catchment area: About 17,119 square miles.
Average rainfall on catchment area: About 28 inches.
Length of reservoir: 39 miles.
Point of abstraction of water: 1½ miles downstream of the Vereeniging Railway Bridge.
Average quantity of water per day which the Board is permitted by Statute to take from the reservoir: 20 million gallons.

Service Reservoirs and Clear Water Tanks.

	Million Gallons
Vereeniging	10
Zwartkopjes	5
Turffontein	5
Simmer and Jack	2·5
Total	22·5

The total length of the pipe line is 44 miles, and will be composed of 18, 22, 26, 27, 29, 30 and 33 inch steel pipes.

Purification of Water.

The silt contained in the water will be thrown down by sulphate of alumina in six settling tanks, which will have a total capacity of 5·6 million gallons. The water will then be passed through mechanical filters, and after leaving the filters will be sterilised by chloride of lime.

Height of Lift.

The water will be pumped from the Vaal River under a head of 80 feet to the Main Station at Vereeniging and then re-pumped, after sterilisation, to Zwartkopjes under a head of 480 feet. From the Zwartkopjes Station the water will be raised under a head of 1,020 feet to the proposed Turffontein Reservoir. The total pumping head, including friction, will therefore be about 1,580 feet. The water will then gravitate from the Turffontein Reservoir to the Central and East Central Rand.

Estimated average cost of water per 1,000 gallons after the Vaal River Scheme has been completed, including fixed charges on current loan and on that to be raised:—

Million Gallons per Day.	Fixed Charges.		Working Costs.	Total.	
	s.	d.	d.	s.	d.
10	1	6½	7½	2	2
11	1	4¾	7½	2	0¼
12	1	3½	7	1	10½
13	1	2¼	6¾	1	9
14	1	1¼	6½	1	7¾
15	1	0¼	6¼	1	6½
16	0	11¾	5¾	1	5½
17	0	10¾	5¾	1	4½
18	0	10¼	5½	1	3¾
19	0	9¾	5¼	1	3
20	0	9¼	5	1	2¼

Fixed charges, present loan	£204,000
Fixed charges, new loan	78,000
	£282,000

The standing charges (£78,000) have to be borne in the following proportions:—Municipalities, 46¼ per cent.; Mines, 46¼ per cent.; South African Railways, 7½ per cent.; total, 100 per cent. The mines' share of the standing charges for the Vaal River Scheme would, therefore, be about £36,000 per annum, and taking the tonnage milled for the twelve months ending March 30th, 1915, as 26,572,863 tons, the additional cost per ton milled, on account of standing charges would be 0·3251 pence, or rather less than one-third of a penny. The previous table shows the estimated cost per 1,000 gallons for fixed charges and working costs, and it will be observed that the costs per 1,000 gallons will be gradually reduced in both cases as the quantity of water consumed increases. For instance, when an average of 12 million gallons per day is being consumed the reduction will be 3d. per 1,000 on fixed charges and ½d. per 1,000 on working costs. That is to say, instead of the water costing 2s. 2d. per 1,000 gallons, as at present, the cost would only be 1s. 10½d. When 15 million gallons per day were being consumed the total cost would be 1s. 6½d. instead of 2s. 2d., and when 20 million gallons per day were being consumed the total cost would be 1s. 2¼d. instead of 2s. 2d. Bearing in mind the reduction in the cost of water per 1,000 gallons which will be obtained in the future, it is surprising that there should be any question in regard to the carrying out of a new scheme when the time is opportune for the flotation of a loan at a reasonable figure. As an insurance alone, it is worth the expenditure, for it must not be overlooked that several mines were on the point of closing down in 1913 and that the consumption will gradually and surely increase in the near future.

(To be continued.)

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* From Presidential Address read before the S.A.I. of E.

TASMANIAN ORCHARDING FOR RAND MINING MEN.

By J. P. Johnson.*

In view of the progressively increasing number of mine staff men who are having apple orchards laid out for them in the Tamar Valley, in Northern Tasmania, an account of the procedure will no doubt be of interest to many of the readers of the *Mining Journal*. The soils on which apples are mostly grown in the Tamar Valley are of two kinds, namely, (1) heavy brown soils resulting from the decomposition of basic igneous rocks which occur in patches throughout the valley, and (2) light grey soils, ranging from sandy clays to clayey sands, with a clay subsoil, which are widespread throughout the area. The brown soils will yield potatoes and other crops year after year, but the grey soils soon get exhausted. For apple-growing, however, the former are not greatly superior to the latter, the longer roots of the trees soon finding their way through the poor loam into the richer clay beneath. The brown soils are usually full of residual stones, which are expensive to remove, and are a source of trouble to the ploughman, whereas the grey loam has neither drawback.

The ground now available is covered with virgin eucalyptus forest, and has to be cleared. The best procedure is first to expose and sever the roots of the trees, grub up the roots, tussocks and bushes, then pull the trees down with tree-pullers, chop them into convenient lengths, and pile them into heaps. After lying a couple of month or so to dry, a fire is passed through the whole, which burns off all the small stuff. What does not burn is piled against the heaps of logs, which have to be kept stoked until reduced to ashes. These last should be spread over the ground, which is then ready for ploughing. This thorough system of cleaning has the advantage that it involves a wholesale destruction of fungus and insect pests, and makes the first ploughing easy. It is, of course, expensive, and for those who cannot afford it, less thorough methods are available. One plan is to first clear the bushes and trees, then mark out the lines for apple trees (which are generally planted 20 feet apart on the square), and grub the roots and tussocks for a distance of three feet on each side and plough these strips only. This will only do for the first season; for the second season an additional foot on each side should be ploughed, and for the third season yet another foot, after which all the ground must be ploughed.

Wherever the ground is grubbed, troublesome weeds, such as sorrel, spring up, and it has to be constantly cultivated to keep them down. Hence a considerable saving is effected by confining the work, as long as possible, to narrow strips. The first ploughing should be done before the heavy rains start in May, and the furrows should be run in the mean direction of slope, so as to readily carry off the water. If the slope is only slight an open drain must also be dug at the bottom. Flattish ground is likely to be sour, and should be sweetened with an application of lime. Before planting it is necessary to enclose the ground with a rabbit-proof fence, as in winter, when grass is scarce, the rabbits are liable to attack the trees. Planting is best done during June, July or August, and the earlier the better, provided conditions are favourable. On sloping ground, where the water readily runs off, the trees may be put in early, but on flattish ground, which is likely to remain sodden for a long time, they should be put in later. Planting should not be done during rainy weather, nor when the soil is more than moist.

The trees usually planted are either yearling rods or two-year headed rods. The latter are preferable, since they make a much sturdier growth during the season following planting. It is not advisable to plant older trees. After the planting comes the pruning. In rich soils and sheltered positions the two-year-old headed rods may be pruned sufficiently long to support the first three pairs of limbs, but elsewhere they must be cut shorter, and only the initial three limbs produced during the ensuing season. As a rule, one does not have to trouble about spraying for pests for the first (or even second and third) season, but last year was exceptionally dry and favourable to insect pests, and several unexpectedly put in an appearance. The most troublesome of these were the case-grubs and a species of weevil whose method of working was to climb up to the newly-pruned tops of the trees and eat away the bark, thus destroying the top buds and spoiling the designed shape of the trees. In some newly-planted orchards the limbs were entirely stripped of bark and the trees completely ruined. Spraying with arsenate of lead solution is an effective preventative. Another annoying visitor was the cicada. This makes a series of incisions in the limbs of the trees, in which it lays its eggs, and although these are not harmful in themselves, they temporarily weaken the young limbs, which are then liable to break in a strong wind. The writer had a number of trees disfigured in this manner, mostly of the Jonathan variety, which makes a slender growth. However, the writer is well satisfied with the results of his first year's planting. Despite the driest season that Tasmania has experienced for many years, his newly-planted trees have made splendid growth. The case-grub and the weevil invaded his orchard, but were fortunately detected before any damage was done, while the ravages of the cicada are not serious, and can be remedied in this season's pruning.

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*Mr. Johnson is a former resident of the Rand, and author of "The Mineral Industry of Rhodesia," and is now settled as an orchardist at Kelso, in the Tamar Valley, Tasmania.

South Africa's Diamond Production.

The effect of the war on the diamond production of the Union is evidenced by the official return for the six months ended June 30th. The production of the mines for the first six months of this year is infinitesimal compared with the previous years, as the following details will show:—Transvaal, 383 carats, value £117; Cape, 565·50 carats, value £2,146. Alluvial and other diggings produced, roughly, a half of the diamonds they did in the same period a year ago, as follows:—Transvaal, 13,304·63 carats, value £47,700; Cape, 23,526·50 carats, value £82,355; Free State, 424·69 carats, £2,144. The total production of the mines and at the diggings during the half-year was:—Mines, 948·50 carats, value £2,263; alluvial, 37,255·82 carats, value £132,199. The production for last year at the mines of the Union was 2,653,089·70 carats, of a value of £4,906,342; while the output of the diggings was 143,924·62 carats, of a value of £576,729.

Manicaland Output.

The mineral output of the Territory of the Companhia de Mozambique (Manicaland) for the month of July, 1915, was as follows:—Mill: Gold won (fine), 414 ozs. 2 dwts. 22 grs.; tons crushed, 1,115; value, £1,719 13s. 9d.; concentrates: estimated gold (fine), 9 ozs.; tons, 4.5; value, £40 5s. Also contains silver and lead, estimated value £28 8s. 10d. Alluvial.—Gold recovered (fine), 459 ozs. 10 dwts. 12 grs.; cubic metres dredged, 50,000; value, £1,904 18s. 9d.

WRIGHT'S ROPES.

THE YEAR WITH THE COMMERCIAL EXCHANGE.

The Business Outlook—Mines, Merchants and the War.

Mr. A. Macdonald presided on the 31st of August, in the board-room of the Chamber of Mines, over the annual meeting of the Witwatersrand Commercial Exchange, and there was a large attendance. In moving the adoption of the annual report and accounts, the Chairman said the membership had increased from 192 to 205, which served to show the continued usefulness of the Exchange to merchants, and pointed to the fact that any firm wishing to do business with the mining groups could not afford to overlook the institution. The Exchange was the medium through which not only the mines, but various municipalities and many other large public bodies transacted their buying requirements. The financial position of the Exchange was strong, there being £4,000 on fixed deposit. Expenditure had been very much as usual. It was unnecessary for him to go into details, except perhaps to suggest some restraint with regard to telephones, the outlay on which for the past year had been over £500. Each message cost 1d., and about 300 calls were registered daily. During the year £150 had been voted to the Prince of Wales's Fund and £150 to the Governor-General's Fund, but in the case of an incorporated body like the Exchange the money could not be paid until the consent of every individual member had been obtained. This, however, had been done. Members and representatives had generously contributed to every fund and collection since the outbreak of the war, and in one instance, that of the Governor-General's Saturday collection over 10 per cent. of the entire amount collected was received from the Commercial Exchange. A smoking concert, held under the auspices of the Exchange, had yielded over £70, and he hoped to see the amount on the Exchange list of the Overseas Fund increased to well over £1,000 in the near future. About 40 members directly associated had taken part in the South-West campaign, and their sacrifices had been greatly appreciated by those who had had to remain behind.

Business and Its Outlook.

Dealing with business and its outlook, the Chairman proceeded: During the past year the Empire, having become involved in the greatest war in history, business has, naturally, been dislocated to an extraordinary extent, but we in Johannesburg have probably felt the effects less than any other part of the Empire. On June 17th the local Press published a report of an annual meeting of one of the mining groups, in which the speaker, while dealing with the increased cost of mining stores and material, said: "Though he admitted that in many instances the higher prices now being charged are unavoidable owing to the increased cost of production in Europe and the heavy freight and insurance rates now prevailing, it is clear that in other cases an undue advantage is being taken by the suppliers of the closing of German and other sources to put the screw on very tightly indeed, with the result that certain articles are being quoted at most exorbitant prices, and these articles most necessary to the economic running of the mines." As your chairman, I think you will approve of my taking this opportunity of flatly contradicting this unfounded assertion. The members of the Exchange were fortunate in having large stocks on hand at the outbreak of the war, and, generally speaking, were only too pleased to meet the increased demand at the then existing pre-war prices, and, without advancing prices, were satisfied with the larger volume of business. I consider mining material merchants deserve the thanks of the mining groups for the ingenuity displayed in getting supplies forward during the past twelve months. Another pleasing feature is that merchants here have been instrumental in diverting to Great Britain business hitherto done with enemy countries, and it only requires the co-operation of the mining houses to maintain the market for British manufacturers for all time. (Applause.) If goods were purchased on their merits and not merely on price, regardless, in some cases, of quality or origin, it would tend to lessen the shoddy class of stuff that unfortunately creeps into this market, due to unfair competition and the constant clamour for the reduction in costs. By the pursuance of this policy, it must be obvious to all, that the contrary to what we all desire is arrived at. Several meetings took place during the past year between a sub-committee of the Chamber of Mines, your Committee, and the Committee of the Mining Section of the Chamber of Commerce, and freely discussed the position in regard to stocks and the probability of shortage. The meetings were most cordial and to the benefit of all, and allayed any anxiety as to the hanging up of the industry. Business now becomes more of a gamble every day, what with the mines carrying from four to six months' reserve stocks, and merchants having to buy at abnormally increased prices from six to twelve months in advance, the outlook is not too bright, but we can only hope that the groups will meet us in the same spirit of fairness which characterised our relations with them in the past.

Information Wanted.

The Chairman then took the opportunity, on behalf of the Exchange, of thanking Generals Botha and Smuts and the Union's gallant troops for bringing the South-West African campaign to a successful termination, and to the British Navy and Army for the protection they enjoyed in enabling them to carry on business in absolute freedom and security. (Applause.) He trusted that by the time of their next annual meeting Great Britain and her noble Allies will have vanquished for ever their arrogant and cowardly enemies. (Applause.) There was one other matter which he should like to mention, because it was one which members would shortly be asked to give information about. The committee had been advised that it was necessary to have the full names and nationality of the principals or partners of every firm which was a member of the Exchange, owing to the necessity of the Exchange being in possession of the names of the persons who were responsible for such firms carrying on business in the name of a member of the Exchange. Hitherto they had not known who were the responsible members of each individual firm, and the committee had, consequently, been sometimes placed in difficulties owing to this lack of information. He hoped that in the interests of all, members would supply the data asked for.

The report and accounts were adopted. Mr. J. McG. Love was unanimously elected chairman for the ensuing year, and Mr. A. Macdonald vice-chairman. The committee was elected as follows: Messrs. R. H. Philpot, F. L. Cartwright, O. Fletcher, J. W. Kirkland, L. Marsh, W. A. Martin, A. J. Niven, W. B. Phelp, W. F. T. Harvey and R. B. Grier. A cordial vote of thanks to the outgoing chairman, vice-chairman and members of the committee was passed.

Photographic Survey of South-West Africa. Previous to the outbreak of war it was decided in Vienna to undertake an aerial photographic survey of South-West Africa, and some interesting estimates were worked out as to the cost of such an enterprise. The method to be adopted was to use two dirigible balloons, and to make a series of aerial photographs from which geographical charts could be constructed. It was proposed to work the dirigibles at an average height of 3,000 ft. for five hours a day. The total cost for the survey was to be close upon £2,000,000, while the time required was thirteen years. By working at a height of 6,000 ft. for 10 hours a day the cost would be reduced by two-thirds, and the time to three and a-half years. Formidable as this may seem, it represents a great saving over the ordinary triangulation method.

A New Mining Work of Reference.

The South African Mining Year-book—the first volume of which has recently been issued—is the only authoritative work of reference on South African mining companies produced in this country. The Editor and Compiler is Mr. S. R. Potter, Editor of the *South African Mining Journal*. The present volume contains, in addition to the official annual statements and accounts, what no other work published on South African mines contains—a full, verbatim report of the speeches made from the chair at the general meetings of the year. The feature that differentiates this volume from existing works is this exact and faithful reproduction of the latest statements, speeches and anticipations of South African mining company chairmen. "When I want to get an intelligent grasp of the position of a mining company, with the least personal exertion, and in the shortest possible time," a well-known financial authority has declared, "I turn to the last annual speech of the chairman." In practice, of course, most people do likewise, though constantly impeded in the process by the wearisome delays inseparable from reference files, or the back numbers of the papers in which lie buried the most brilliant efforts of our ablest leaders of industry. On the other band, the small investor and prospective shareholder, unimpeded by such files and without access to even the usual expensive works of reference, often finds himself utterly unable to gauge the position of a mining company, and is the prey of any rumour or garbled exaggeration that comes his way. To meet this need—the legitimate measure of his caution and intelligence—and the convenience of more favoured classes, the present work is published, and at a price that will appeal to all and make it prohibitive to none. With a few exceptions, the majority of South African mining companies hold their annual meetings in the second quarter of each year. The season of meetings has only now concluded, and no unnecessary time has, therefore, been lost in the issue of this collection of the complete and revised reports of the proceedings. In addition to a careful and detailed review of the operations of each company in 1914, giving each fact and event in its true relative proportion and significance as seen in time's proper prospective, the chairmen's annual speeches almost invariably include an account of the progress of each concern during the current year. The value of this authoritative revision of the position of each company, right down to date, is obvious. On examination, indeed, the idea underlying this compilation will be found to disclose merits and advantages, possibly not at first apparent. Regarded as a whole, it may be described as a complete account of the present position and future prospects of South African mines put on permanent record for ready reference. It can likewise claim to constitute at once a unique, official hand-book, an annual review and an investor's guide to the future. While useful to present shareholders in the companies concerned, it is simply invaluable to all prospective ones. It is not too much to say that it sets out in the smallest possible space the past record and performance, together with the future promise, of South African mines, and that it embraces the only official explanations available regarding the vexed questions of mine finance, ore reserves, "lives" and development. In a word, it can fairly boast to be a compilation of authoritative pronouncements forming a necessary supplement to existing works of reference and essential to the proper valuation of the shares of the mining companies with what it deals. A few South African mining and finance companies issue their reports and hold their meetings at dates that make their inclusion impossible in this issue. To cover the annual meetings of these companies and to put on record a vast amount of data concerning the companies reviewed—and crowded out of this impression—a second and supplementary volume of this work, which is now in preparation, will be issued at a later date. In the meanwhile, last year's reference works, if supplemented by, and read in the light of, the information contained in the pages of the Year-book will provide the investor and others interested with the necessary knowledge of the position of each company. Moreover, the inclusion of the exhaustive annual addresses of the President of the Transvaal Chamber of Mines, of the leading bank chairmen and of the heads of other financial and industrial institutions, increases the value of the whole and rounds off the picture it presents of the year in mining, finance, engineering, metallurgy and the allied sciences. The Year-book, which is beautifully printed by the Argus Company, and bound in red cloth, is published at 10s. 6d., or will be sent from this office, post free, for 12s. to any part of South Africa.

Natal Ammonium, Ltd.

The general manager of the Natal Ammonium, Ltd., writes to the papers as follows:—"During the recent anti-German rioting it was reported to me that there was a rumour that the Natal Ammonium, Ltd., was practically financed by 'German capitalists.' I, therefore, deemed it advisable to refer the matter to my London office, as a false rumour, once started, is often difficult to overtake and may lead to misunderstanding in the future, particularly in a case such as ours, where an entirely new industry is being commenced in South Africa. My London board advises me that 98·2 per cent. of our share capital of £325,000 is held by British subscribers (about 900 subscribers scattered throughout the whole of the Old Country, comprising all classes of people). We have only three foreign shareholders, one of who is a Belgian, and their combined holding is the trifling one of 1·8 per cent. of the whole, which is probably far below the average of such holdings in Government and Colonial stocks, railways and ordinary industrial companies, such as ours. Our directors and staff are all British subjects. One of our directors, Mr. Herbert Morrison, has left us temporarily and is now Commandant of the Belgian Field Hospital. Another, Mr. Robert Armitage, is entirely occupied in the manufacture of munitions. So far as I am aware, the whole of our plant and machinery, some 5,000 tons in all, is manufactured in the United Kingdom, as evidenced by the usual customs declarations. I may mention that Lord Selborne was our chairman till he joined the new Imperial Cabinet, when he resigned that position. Therefore, from an ultra-patriotic standpoint our record is not a bad one."

Specimen copies of the *South African Mining Journal* can be had from our Agents, Argus South African Newspapers, Ltd., Byron House, 82-85, Fleet Street, London, E.C.

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THE WEEK IN THE SHAREMARKET.

Steady with Better Tone—Business Restricted—Increased London Demand.

THE market improved this week, and prices in most cases are steady at higher levels. London reports an increased demand for South African stocks, and quotations of most of the Far East Rand counters have advanced. Business fell off on the local market towards the close of the week, and the only features were improvements in the Modder group and in Zaaiplaats. The general market prospects appear quite favourable.

* * * *

	Fri., 27th.	Sat., 28th.	Mon., 30th.	Tues., 31st.	Wed., 1st.	Thurs.. 2nd.
Adair-Ushers	—	0 3*	0 3*	0 3*	—	0 3*
African Farms ..	7 6*	7 6*	7 6*	7 6*	7 6*	7 6
Apex Mines	14 6*	14 6*	14 6*	14 9*	—	14 6*
Aurora Wests	7 6*	7 6*	7 6*	7 6*	—	7 6*
Bantjes Cons.	5 6*	6 0†	—	5 3*	—	5 9†
Brakpan Mines .	57 0*	57 0*	58 3*	60 0	59 0*	58 6*
Brick and Potteries	5 0*	—	5 0*	5 0*	—	5 0*
Cassel Coals	16 6*	16 6*	17 0*	17 6*	—	17 6*
Cinderella Cons.	2 9*	3 0*	—	2 9*	2 9*	2 9*
City and Suburbans. .	39 3	40 0	41 0*	41 0*	41 0*	42 0*
City Deeps	61 9	61 0*	61 0*	61 6*	61 6*	60 6*
Cloverfield Mines	4 9*	5 0*	5 2	5 2*	5 3*	5 3*
Clydesdale Collieries... ...	10 6*	—	10 6*	10 6*	10 6*	10 6*
Cons. Langlaagtes...	37 0*	—	36 6*	36 0*	36 0*	36 0*
Cons. Main Reefs	18 0*	18 0*	17 9B	17 9*	17 9*	17 9*
Cons. Mines Selection ...	8 9*	9 6†	9 0*	9 3*	8 9*	8 9*
Coronation Collieries	26 3*	26 0*	26 0*	—	—	26 0*
Coronation Freeholds	—	—	—	—	—	0 6†
Crown Mines	76 0†	76 0†	—	—	—	—
Crown Mines Debentures...	£98*	£98*	£98*	£98*	£98*	£98*
East Rand Centrals	2 9*	2 9*	2 11	3 1	—	2 9*
East Rand Coals	1 7*	1 7*	1 7*	—	1 7*	1 8*
East Rand Deeps	1 2*	1 3	1 2*	—	1 3*	1 3*
East Rand Minings	4 0*	4 0*	—	—	5 6*	—
East Rand Props	20 6*	—	22 6†	—	22 6†	—
East Rand Debentures .	£83*	—	—	—	—	—
Eastern Gold Mines	1 1*	1 1*	1 1*	1 2	1 1*	1 1*
Frank Smith Diamonds ...	1 3*	—	1 3*	1 6†	1 6†	1 6†
Geduld Props.	30 6	30 6	30 9*	31 6	31 0	30 6
Glencairns	2 0*	2 0*	2 0*	—	2 0*	2 0*
Goerz & Co.	—	11 6†	—	10 0*	10 0*	—
Government Areas	21 9	21 6*	22 0	23 0	23 0	22 9
Jupiters...	5 6	6 0†	5 9†	5 6	5 9*	6 0†
Klerksdorp Props.	—	1 6*	1 6*	1 6*	—	1 6*
Knight Centrals	6 10*	6 10*	6 10*	6 11*	7 0	6 11
Lace Props.	3 4*	3 6*	3 11	3 9*	3 11	4 0†
Luipaardsvlei Estates... ...	5 6*	—	5 6*	5 0*	5 6*	—
Lydenburg Farms	3 1	3 0*	3 0*	3 4	3 1*	3 2*
Main Reef Wests	6 9	6 6	6 6	6 6	6 6*	6 6*
Main Reef West Debs. ...	£62½*	£62½*	£62½*	£62½*	£63*	£62½*
Middelvlei Estates	—	—	—	1 3	1 6†	1 3*
Modderfontein B....	103 0*	105 6*	106 0*	106 6	—	105 0*
Modder Deep Levels... ...	98 0	97 6	99 0	99 3	98 6*	98 0
Natal Navigation Colls. ...	—	—	—	—	—	15 0†
New Boksburgs	0 10*	0 10*	—	0 10*	0 10*	1 0†
New Eland Diamonds... ...	10 0†	—	10 0†	—	10 0†	10 0†
New Era Cons.	6 6*	6 6*	6 7*	6 9*	6 9*	6 7*
New Geduld Deeps	2 2*	2 3*	2 3*	2 3*	2 3*	2 3*
New Kleinfontein	22 0*	22 0	21 7½	21 9*	31 9*	21 9*
New Modderfonteins... ...	300 0*	300 0*	310 0†	310 0†	300 0†	305 0B
New Primrose	—	—	—	—	10 0*	—
New Rietfonteins	1 0†	1 0†	1 0†	1 0†	—	1 0†
New Unifieds	15 0*	—	15 0*	—	—	—
Orange Diamosds...	0 6†	0 6†	0 6†	—	0 4†	—
Pickstone Mines	—	7 6†	—	—	—	—
Pretoria Cements	41 0*	42 6†	42 0	—	—	—
Princess Estates	3 6†	3 6†	3 6†	3 6†	2 6*	2 6*
Rand Collieries	—	—	—	2 0†	—	2 0†
Rand Klips	3 9	4 0	4 2	4 7	4 4	4 0*
Rand Nucleus	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps	2 8*	—	2 8*	2 10*	2 9*	2 9*
Randfontein Estates	13 0*	—	12 6*	—	13 0†	12 6*

A Ex London. B Odd lots. * Buyers. †Sellers.

	Fri.. 27th.	Sat., 28th.	Mon., 30th.	Tues., 31st.	Wed., 1st.	Thurs.. 2nd.
Robinson Deeps .	19 6*	—	—	—	—	—
Rooiberg Minerals	16 0*	—	—	15 3*	—	—
Roodepoort Uniteds	2 0*	2 0*	—	—	—	2 0*
Ryan Nigels	—	—	—	—	2 9*	2 6*
Shebas	—	—	—	—	2 4†	2 4†
Simmer Deeps	—	2 0†	—	2 0†	1 6*	1 6*
S.A. Breweries	—	—	—	30 6*	30 6*	30 6*
S.A. Lands	2 6	2 6*	2 6*	2 8*	2 7*	2 7*
Springs Mines	25 6	26 0	26 0	26 3	26 0	25 6*
Sub Nigels	9 9	9 6*	9 6*	—	9 9*	9 6*
Transvaal Coal Trust ...	37 0	—	37 0*	38 0*	38 6	37 6*
Transvaal Lands	—	—	—	11 0*	—	—
Transvaal G.M. Estates ...	30 0*	31 0	31 6†	30 0*	32 0†	30 0*
Van Ryn Deeps	50 9	50 0	50 9	50 6	50 0*	49 6*
Village Deeps	33 6*	—	33 6*	—	33 6*	35 0†
Vogelstruis Cons. Deeps...	1 0†	0 9†	—	1 0†	—	0 9†
Welgedachts	—	—	—	13 0A	13 0*	—
Western Rand Estates ...	0 9*	—	—	—	—	0 9*
Witwatersrands	—	—	54 6	—	—	52 6*
Witwatersrand Deeps... ...	26 6*	26 6*	26 6*	—	26 0*	26 6
Wolhuters	12 0*	12 0*	12 0*	12 0*	12 0*	12 0*
Zaaiplaats Tins	15 0	12 0	13 6	13 0B	13 6	13 3*

A Ex London. B Odd lots. * Buyers. †Sellers.

MINING PROPOSITION.

WANTED, PARTNER with small capital. Alluvial and reef, suitable for cyanide, on farm Morgenzon.—Clewer Mines, Pilgrims Rest, Box 62.

Australian Mining in 1914.

The annual report of the Commonwealth Department of Mines for 1914, which was recently issued, shows a mineral yield of £10,499,720, being a decrease of £1,595,364 on that of the previous year. Considering the disabilities produced by the war, this is regarded as very satisfactory. The coal output was 10,390,622 tons, valued at £3,737,761, being a decrease of 23,543 tons. This was regarded as gratifying, in view of the fact that several of the large collieries in the Maitland district had not worked since May last, in consequence of a dispute over the afternoon shift. The output of silver-lead-zinc for 1914 was valued at £4,632,080, a decrease of £1,089,774. The outlet for zinc concentrates, Germany and Belgium, having been closed by the war, the quantity exported only totalled 359,310 tons, valued at £1,020,711, being 147,350 tons less than for the previous year. A noteworthy advance was recorded in connection with the treatment of slimes. The Zinc Corporation was said to have been most successful in this respect, high recoveries of silver and lead contents having been obtained by means of the Lyster process. The production of ore from the Verranderie field for 1914 was greater than in the previous year, the value being £82,653 as against £77,546. The field is described as greatly handicapped by want of connection with the State railway system, the cost of freight by horse team being over £2 per ton. The value of the year's production of copper was £274,671, a decrease of £324,062 on that of 1913. One of the chief causes of this reduction was said to be the closing down of the smelters at the Great Cobar mine on April 9, 1914. The output of tin and tin ore was valued at £267,130, being a decrease of £154,162. The mining operations were so adversely affected by the war that the industry was brought almost to a standstill. Regarding gold, a still further decrease is noted. The dredges furnished an increased production, but the recovery of alluvial gold by other methods was on a reduced scale. The yield of Mount Booby Mine was well in advance of that of 1912. No discoveries of moment were made during the year.

INVESTORS' DIARY.

FORTHCOMING COMPANY MEETINGS.

Sept. 10.—Swaziland Tin.
Sept 17.—Transvaal G.M. Estates.
Sept. 24.—Sub Nigel; Simmer and Jack Proprietary.
Oct. 29.—Knights Deep.

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£100 REWARD.

It having come to our notice that certain false statements are being made as to the constitution of the firm of J. K. FULTON & CO., 14, Brown's Buildings, Johannesburg, we wish to inform the public that Mr. J. K. Fulton is the sole proprietor of the above-named firm, having purchased the business of B. Raffael & Co., on the 26th day of June, 1914.

We have no connection whatever with the firm of Raffael Bros., Manchester, or with Mine Lubricants, Ltd., Johannesburg, in which Raffael Bros. have a large interest.

The above reward will be paid to any person disproving any of the afore-going facts, or give information which will lead to the conviction of any person or persons spreading the afore-mentioned false rumours.

(*Signed*), **J. K. FULTON & CO.**

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Stocks Coming Forward Quite Regularly—Prices are Easier in Consequence—The Annual Meeting of Commercial Exchange—The Abuse of the Telephone Craze.

Business throughout the mining material trade has been exceptionally quiet, so far, this month. There seems to be an undercurrent of feeling that the mines are holding off and using rather liberally from their accumulated stocks, presumably because shipments are now coming forward so regularly that it is not unlikely that prices will recede. For example, goods comprised wholly or partly of copper have eased in value because of a decent drop of about £20 per ton in London simply because the British Government is assisting manufacturers to keep their works going, now that something like order has been put into the munition production. This is on a par with the fall in galvanised iron mentioned last week, where the British Government released spelter to encourage makers to put on a spurt, and re-open their galvanised iron works. Taking a general view of the mining position, hardly any improvement can be expected in the sale of materials, as it is only natural that the directors of a mine are keeping their information up to date, equally so with the importers. A director of a big producing company states that no expansion can possibly happen during the war and its uncertainties. It is sufficient for the mines to keep pegging away and not slacken the output from month to month until the war clouds lift somewhat, which he ventured to predict would be a long while. Continuing, he remarked what idea can the man-in-the-street have, as against the original, authoritative announcement of a three years' war, allowing a liberal margin on both sides of that estimate.

Commercial Exchange.

The annual meeting was held on Tuesday of this week. The increase of membership during the year was from 192 to 205, which does not of necessity signify the popularity of the Exchange, but an increase of members because the mining material business has become so concentrated, and merchants catering for the mines must be represented on that particular spot. The fact is, the mining business is looked upon as an absolute certainty as regards payment and the centring of the buying and selling has undoubtedly created an excessive competition in values. Hence, if there has been a little holding back for better prices, it is hardly fair for the mines to grumble. However, the chairman flatly contradicted that such had been, but he may have protested a little too much. It is common knowledge that many speculators have been around picking up things in a small way, and accumulating them with the view of getting enhanced prices. Occasionally they had some measure of success, but it invariably happened that any slight increase in the price of an article unearthed supplies from somewhere or another. The fact is that mining material was brought from all parts of South Africa, especially from the Premier, Kimberley, and Jagersfontein, when the mines at these places slowed down. The fact is that a superabundance of mining stocks had been slowly accumulated in South Africa, as hardly a line had been asked for since the war by the mines here which could not be supplied within a week. The accumulation was more a matter of chance, as undoubtedly a dead set was made by the Continental producers, and America, simply because of our practically ready money market, and it was recognised that the British makers had the best portion of the best trade. Reference was made as to the British retaining this trade in the future, which could to a great extent be done, providing the buyers look after the quality and serviceable properties of the machinery and stores, and not unduly sacrifice everything to cheapness. To assist that position, something tangible might be done by rebates and tariffs, which would then give encouragement to local makers. In this respect it is surprising what Johannesburg people are doing to supply all kinds of spares and fixing up new parts for machines emanating from all quarters of the globe. Naturally, the cost is more, but with a constant demand for many articles, factories might be assisted to make things for our own South African mines, as it is out of the question to have export manufactories.

Foundry Works.

An enthusiastic supporter of local industries states that a shafting weighing about eleven tons was recently treated in a Johannesburg works. During the treatment a pressure of 193 tons had to be exerted to get the connections of the shafting apart, which was the most difficult problem to solve. However, by patience and skill the difficulty was overcome, and a good and satisfactory job was finished for one of the mines. A question was ventured as to the advisability of obtaining larger machinery. The answer came rather impetuously that the principal foundries had machinery quite up to date, and the shops could tackle anything required by the mines. A rider was also added that he did not consider the mines treated the local works any too well, as some thousands of pounds had been spent in first-class machinery, which was often idle, whilst the interest and establishment charges went on all the same. However, Johannesburg is a wonderful place for hope, and it may be better after the war; in the meantime, remarked our informant, there is the encouragement to extend the foundry business.

The Telephone Craze.

One lesson, mentioned by the Chairman at the Commercial Exchange meeting, might well be taken to heart by office men and traders; it is the excessive use made of the telephone. This innovation has become a practical necessity to the office or shop, but its use is so often abused that it has become an important item as regards the increase of working expenses. A thoughtless case occurred the other day where a man about town had the audacity to ring up a factory, and asked to speak to a workman, but the manager absolutely refused to allow his men to be disturbed during the working hours. However, he offered to take a message, but this did not suit, as it came out, owing to the heat and anger of the man about town, that the message referred to an anticipated racing transaction, and, in fact, how much had to be put on a gee-gee. It is seldom a newspaper man can obtain authentic information on such a subject, but undoubtedly any number of useless and private messages go over the 'phone, especially just about the luncheon hour, particularly if the chief rushes away a few minutes before time to catch "the express" car. If an automatic register could be fixed on each instrument similar to a cash register, much saving of expense, to say nothing of a time saving, could be immediately checked. The successful man keeps his eye upon all such little leakages, and this note is just a reminder of the necessity.

Iron, Steel, and Hardware Goods.

Builders' ironmongery, hardware fittings, stoves, enamelled baths, and sanitary ware is just now under a cloud of stagnation, as the demand for residential buildings has slowed off since the middle of last month. There is no difficulty about getting stocks, with a few isolated exceptions, and excellent substitutes are usually available. Steel plates have advanced in consequence of a rise in Britain. The following are the recognised quotations:—10ft. x 4ft. x 1-16in., 22s.; ditto ⅛in. and 3-16in., 21s.; ¼in. and upwards, 20s. per 100 lbs.; 10ft. x 5ft. x 1-16in., 23s. 6d.; ⅛in. and 3-16in., 22s. 6d.; ¼in., 21s. 6d.; 10ft. x 6ft. x 1-16in., 25s.; 3-16in. and ⅛in., 23s. 6d.; and ¼in. up, 22s. There is a shortage of 16lb. tram rails. All smaller-sized pipes are getting scarce, and the price is fractionally higher. Second-hand goods are still coming into the Johannesburg yards from the various mines recently sold off. There are constant enquiries for small second-hand batteries for the Northern Transvaal.

Electrical Goods.

Business continues quite steady, but the scramble for goods is over. The demand from Durban for lamps has been satisfied, as they drew freely on Maritzburg and Johannesburg, and now they have received supplies direct from London and America. It appears that Durban was not singular in not purchasing from oversea at the time the electrical market was in such a fluctuating condition, when at times things went up overnight to anything over 100 per cent. However, merchants have become reconciled to the higher lever of prices, and are sending indents forward both by cable and mail under the new conditions. There is a scarcity of rubber flex, as the stocks recently to hand have been absorbed, hence an advance from 4d. to 6d. per yard. This is used for pendants, etc., and the consumption is very heavy for renewals from month to month, but the shortage is expected to be only a temporary one. Coils of wire 3/20 gauge are scarce, but 3/22, which was almost unobtainable a short time ago, is again available in plenty. Consignments of British opal shades were received this week, being the first to arrive here since the war, which is another proof of the superabundance of stocks here before the war.

Paints and Oils.

There is a little better demand, as property owners are having repairs and furbishing done, in view of the rains being expected earlier this year. There is no alteration in the price of white lead here, although the values of pig lead have been very fluctuating, and on balance easier, of late in Glasgow, but so far it has had no decided effect on the manufactured article; therefore, heavy orders will not be placed oversea, pending positive indications of a steadying or even slowing down of the price. Linseed oils have an easier tendency since heavy supplies have reached the London market. Contractors whose standing is undoubted, as well as cash customers, are favoured somewhat in large orders, as supplies are arriving more regularly, and stocks in Johannesburg are accumulating with a fuller assortment, as compared with the position of three months ago.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; plates, 20s. to 25s. per 100 lbs.; hexagon bolts, ⅜ in., 6d. per lb.; ½ in. up to 2 in., 37s. 6d.; 6 in., 35s.; over 6 in., 32s. 6d.; ⅝ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 30s.; over, 29s.; ⅞ in. and 1 in., 29s., all per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 40s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 35s. to 47s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d. and 5s. 6d., 30 in., 12s. 6d., 36 in., 15s. 6d., 42 in., 18s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6ft. to 10ft., 7½d. to 8d., 11ft. 8¼d., 12ft. 8½d.; 26 gauge, 6ft. to 8ft. 6d., 9ft. 6¼d., 10ft. 6½d.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 30s. to 35s. per 100 lbs.; solder, 50 per cent., 1s. 3d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9¼d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4d. per sq. ft.; ditto, 4½ x 1⅛ and 6 x 1⅛, 5d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 3s. 9d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.

Bricks, cement, lime, etc.: Cement, imported, 32s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 19s. 6d. to 22s. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 42s. 6d. 2/5 galls.; coal tar, imported, 8s. 6d. to 9s. 6d. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil, 22s. 6d. per 5 galls.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 22s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 11s. 11d. 2/5; petrol, 22s. 2/5; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £18 10s. per 75 lb. bottle: bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 4s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 3d. lb.; hypo, 1s. 6d. lb.; acetate lead, 70s. 100 lbs.; litharge (assay) 50s., (commercial) 40s. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; radiator lamps, 4s. 6d. each; double pure rubber flex, 6d. per yd.; 3/20 coils of wire, 25s.; do., 3/22, 20s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 10s. doz.; switches, 5 amp., 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. to 15s. 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Ohlsson's Cape Breweries.

Considering the difficulties encountered during the past financial year, Ohlsson's Cape Breweries has managed to make quite a respectable showing. The trading profit at £74,800 is only £5,300 down, and the net profit comes out at £35,900, as compared with £42,200. The Ordinary dividend is maintained at 8 per cent. and £24,500 goes forward, or a slightly larger sum than was brought in. The accounts for the first time have had to bear a Colonial income-tax, and during the current year will also have to stand a heavily increased excise. These are some of the burdens the war is imposing on undertakings in South Africa, but Ohlsson's is an excellent business, and has seen worse times through.

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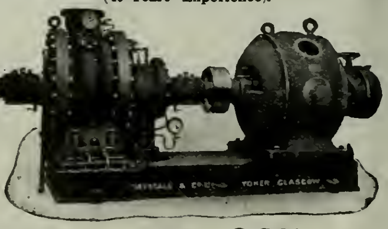

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Commerce and Industries.

War Company Registrations.

The number of new company registrations registered in the half-year ended June was slightly less than that in the second half of last year, whilst the total capitalisation was very much less. The *Investors' Guardian*, in its half-yearly review of the returns, states that the number of new companies formed was 1,996, with a capitalisation of £27,462,000, a drop of ninety-six companies and of £10,610,000 in capital from the figures for the second half of last year. The following particulars are given:—

English Registrations.	1st half, 1913.	1st half, 1914.	1st half, 1915.
Coal and fuel	£3,969,508	£2,117,350	£955,500
Electric	4,498,787	688,900	644,050
Engineering & hardware	4,466,459	3,181,035	1,737,207
Mining and exploration	8,430,445	5,296,000	252,115
Motor, cycle, 'bus & car	4,783,460	3,579,303	1,103,700
Railways & tramways	2,459,007	1,545,000	—
Shipping	1,814,502	5,451,125	3,899,405
Timber	988,404	1,031,357	596,875

* * * *

The Effect of War on the Steel Trade.

For a considerable period prior to the outbreak of hostilities trade in general in Scotland could hardly be termed satisfactory. With few exceptions works were finding considerable difficulty in securing sufficient business to keep their plants in operation, and there and there mills were being stopped and furnaces blown out. Further, those concerns which managed to secure contracts were in many cases in an unenviable position in view of the fact that prices were, to say the least of it, far from remunerative, says the *Engineer*. Among other reasons, the chief cause for this depression was the great and ever-increasing competition from the Continent, and particularly Germany. Manufacturers there were producing similar materials to those produced at home at such greatly reduced prices that we were forced to stand aside and see contract after contract go past us. Not only so, but the home consumer also found it imperative to purchase the foreign article in preference to the local product. Combined with the large import of competitive materials from America, this continental competition was slowly but surely producing a serious state of affairs in commercial circles in Scotland. Time after time manufacturers of steel and iron products reduced their prices until they had reached the absolute minimum, but this had no practical effect on the situation, and the position was becoming more and more untenable. Not only was trade unsatisfactory, but there were increasing rumours of industrial strife which could not be ignored, and in well-informed circles it was thought that a trade war was imminent. On all hands the workers were preparing to launch ultimatums, including demands which would have been wholly impossible from the employers' point of view, and the industrial atmosphere was electrified. Then all at once a complete change came over the scene. War was declared and private disagreements were laid aside. The first effect of the war was, naturally, a total stagnation of trade. Commercial enterprises of all kinds were depleted of the workers, while many concerns, the business of which was largely with the belligerent countries, were totally at a loss how to proceed. Some time elapsed, of course, before conditions became more settled and change succeeded change. Now, at the end of nearly twelve months of war, we find ourselves in a wholly unthought-of position. The paper continues:—

> At the outset of the war there was a great feeling of insecurity in commercial circles and business was only done on a day-to-day principle. Gradually, however, it was recognised that, apart from America, Britain was the world's only source of supply. It seemed at one time that there was nothing to prevent America from stepping in and securing the bulk of the Overseas trade, but then the fact was lost sight of that the carrying power was in the hands of Britain, which controlled the mercantile marine. A large number of vessels has been commandeered by our Government and tonnage has become so scarce that even if America wished she cannot secure sufficient boats to load her merchandise, and practically all the cargoes exported from that country comprise materials necessary to this country and her Allies for the conduct of the war. This same contingency has practically eliminated the private trader at home. Works and factories of all kinds and shipbuilding yards are now employed on War Office and Government business, and private enterprise is at present almost entirely shelved. It is true that some ordinary contracts have been placed, but in some cases these have had to be abandoned owing to the inability of the works to guarantee deliveries under the present conditions. Never in the history of the Scotch iron and steel and allied trades has there been such a time of activity. The pressure for delivery of materials of all kinds has been enormous and continue to increase, and outputs are only limited by the amount of labour available. Owing to the character of the work being done it is undesirable that statistics should be made known. Commercial men are now turning their attention to the question of industrial activities after the war. It is recognised that there is a likelihood of a slump in trade, and great efforts are now being made to arrange for the establishment of factories to produce materials formerly imported from continental countries.

* * * *

Cape Asbestos.

The twenty-second ordinary general meeting of the Cape Asbestos Company, Ltd., was held recently at the registered offices, 23, King Street, Cheapside, E.C., Mr. L. Breitmeyer (chairman of the company) presiding. The Chairman said, *inter alia*:—The report and accounts having been circulated, with your permission we will take them as read. The accounts before you cover five months of the most momentous time in the history of England in recent times. Immediately after the outbreak of the war all business was completely disorganised owing to the difficulties experienced in shipping freights, and the forwarding of all supplies, and our anxieties were increased by the outbreak of the rebellion at the Cape, which affected the district in which our mines are situated and threatened there a dislocation of our working operations. To show you the seriousness of the position I may tell you that our mine manager, Mr. Olds, was captured by the rebels and held as a prisoner for a few days, when fortunately he managed to escape. By the quick defeat of the rebels and the pacification of the country our mining work was carried on without the threatened interruption. Considering all these many difficulties I hope you will agree with me that the results as disclosed in the accounts, which are about the same as those of the previous year, must be deemed satisfactory. Our foreign interests in Italy and France suffered to a similar degree from the effects of the war; one of them, the Cie. Française de l'Amiante du Cap, suffered even more, and none of these concerns could declare dividends and so contribute to the revenue of the year. With the Bergedorf factory near Hamburg, in Germany, in which we hold a large interest, it was not possible to communicate. We were given to understand that the German Government had assumed control and put in a supervisor. Our trade balances due to us by these subsidiaries, which are for the time locked up, we hope to recover in due course, but, to make provision against possible trade losses and losses chiefly on account of the depreciated exchanges, it is proposed to strengthen the reserve and to set aside £5,000, bringing same up to £15,000. From the profit balance of £7,211 4s. 8d. we propose to pay the usual 5 per cent. dividend on the preference shares, and to carry forward the remaining balance of £4,211 4s. 8d. to next year's account. The Barking factory, which was completed towards the end of 1913, is now working in full swing and to our entire satisfaction.

AMUSEMENTS.

NEXT WEEK'S PROGRAMME.

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Engineering Notes and News.

Engineering Standards Committee.

The first annual meeting, since its reorganisation, of the Sectional Electrical Committee of which Sir John Snell is the chairman, was recently held to approve such work as was completed during the session, and to receive the reports of the work in progress. As a result of this meeting, it is understood that the following reports, which have been transmitted to the Main Standards Committee for ratification, will shortly be available to the public: (1) British standardisation rules for electrical machinery; (2) British standard specification for electricity meters; (3) British standard specification for charging plug and socket for vehicles propelled by electric secondary batteries; (4) British standard specification for wall plugs and sockets, 5 ampere, 2-pin without earthing device. As to the progress of the work in hand, it may briefly be stated that the Sub-Committee on Electric Power Cables, of which Mr. C P. Sparks is the chairman, has under consideration the revision of the report on copper conductors (report No. 7, revised March, 1910). The Sub-Committee on Electric Lamps will, in co-operation with the Tungsten Lamp Association, in the early autumn, consider the drafting of a standard specification for tungsten lamps, and the question of miners' electric lamps will also engage the attention of this Sub-Committee. The Sub-Committee on Electrical Accessories, of which Mr. C. H. Wordingham is chairman, has several panels at work, and it is hoped that recommendations will soon be forthcoming in regard to motor starters, heating and cooking apparatus, and fuses, as well as other electric fittings. A panel has also been formed to revise the standard specification for ammeters and voltmeters (report No. 49, issued in September, 1909), and on this panel the British Electrical and Allied Manufacturers' Association will be represented by Mr. E. B. Vignoles and Mr. Patrick Hamilton. Lastly, the Sub-Committee on Electrical Symbols, presided over by Dr. A. Russell, has appointed two panels, one to draw up a British list of graphical symbols for use in installation and power work, and the other to deal with telegraphs and wireless symbols. The extremely important question of standards for distributing pressures for new systems, which has been brought forward by Mr. C. H. Merz, is to occupy the attention of a sub-committee, under the chairmanship of Dr. R. T. Glazebrook, C.B., upon which all interests will be represented. As a rough gauge of the activities of the Committee, it is noted that during the past year more than 90 meetings have been held, and from the above record of work accomplished and in hand, it will be appreciated that the Electrical Section of the Committee is engaged on work of the highest importance to the industry at large.

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South African Railways.

The question of African railway gauges, is discussed in this month's *South African Railway Magazine.* The object of the writer, Mr. E. H. Gray, is to call attention to the lack of uniformity in the gauges of the various railway systems of the African Continent, and to offer some suggestions with a view to their standardisation. The question is not of course immediately practical, nor is it likely to be until the war is at an end, but inasmuch as one consequence of the war and the subsequent settlement is pretty certain to be the transfer of several important systems from their present control to some other Government direction, the notes are not without interest, even to-day. In the whole Continent, there were at the time the article was written some 28,220 miles of line open or under construction, and there were seven different gauges in existence, ranging from the 4 ft. 8½ in. gauge which the French have adopted in Algiers and Tunis, and the British in Egypt, to the 2 ft. gauge which is to be found in the case of a few light lines in the Union. Summarising the mileage of the different gauges, we have the following result in order of precedence: 15,168 miles of 3 ft. 6 in. gauge; 6,446 miles of 3 ft. 3½ in. gauge; 3,147 miles of 4 ft. 8½ in.; 1,566 miles of 2 ft. 6 in. gauge; 950 miles of 2 ft. gauge; 695 miles of 3 ft. 5½ in. gauge; 248 miles of 2 ft. 5½ in. gauge. The broad gauge of the Algerian and Egyptian systems is confined to the northern coastal belt, which is isolated from the rest of the Continent by the Sahara Desert. Hence the only gauge which can be considered a serious competitor with the standard gauge of the Union—3 ft. 6 in.—is the 3 ft. 3½ in., which, for some inscrutable reason, was adopted by the Imperial Government in British East Africa, though it might have been supposed that the ultimate connection of the Union and Rhodesian systems with the Uganda line would have been kept steadily in view. Mr. Gray suggests that, in view of the experience of Australia, where the introduction of uniformity of gauge is one of the great problems of economic development, it would be well that the same question be tackled on the African Continent before the development of rival gauges has advanced too far. Australia estimates that it will cost her some twenty-eight millions sterling to standardise her gauges. A comparatively small sum would probably suffice in Africa to-day, and the question is worth keeping in mind when peace returns. It would, of course, be a matter for agreement on international lines.

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CONTENTS

PAGE
Notes and News ... 25
Topics of the Week:
Tin Prices and South African Tin Companies .. 27
State Encouragement to Mining ... 27
Oil Prospects in Portuguese East Africa ... 29
The "Safety First" Prize Scheme ... 30
Mining Conditions on the Rand ... 31
Efficiency Engineering in Mines ... 32
The Collapse and Recovery of the Bantjes Central Incline Shaft ... 33
The Position of Swaziland Tin, Ltd. ... 34
The Year with the Rooiberg Tin Mine ... 35
Recent Investigations on Dust in Mine Air and the Causation of Miners' Phthisis—II. ... 36
August Output: Group Returns ... 37
The Water Supply of the Rand—VII. ... 38
Rhodesian Section:
Latest Mining News ... 39
Mine Safety, Sanitation, and Welfare Bulletin:
Miscellaneous Mine Accidents ... 41
Personal ... 41
Correspondence and Discussion: "The Mines and Recruiting" ... 43
The Week in the Sharemarket ... 43
The Week in the Mining Material and Engineering Trades ... 45
Commerce and Industries ... 47
Engineering Notes and News ... 49

Notes and News.

The Diamond Position.

In regard to the prohibition of the export of rough diamonds from the United Kingdom, complaints have been made in connection with the constitution of the Committee appointed by the Board of Trade to supervise matters. Under the new regulations, all exporters of diamonds (other than diamonds suitable for industrial uses) should apply to the Committee for the necessary certificate for each separate parcel it is desired to export. The members of the Committee are Mr. A. Mosely, C.M.G., Mr. L. Breitmeyer, and Mr. V. A. Litkie. The burden of the complaints is that there is no independent business man on the Committee; that the Diamond Syndicate is represented by Mr. L. Breitmeyer, and that any diamond merchant outside the syndicate is not represented at all, and would have to disclose his position and his transactions, and might, therefore, doubtless unintentionally, be prejudiced in his business. All diamond merchants are not fortunate enough to be included in the syndicate, and if those outside have ground for belief that they would be at a disadvantage in their business by being forced to show their hand to competitors, the complaints doubtless will receive suitable recognition in the proper quarter. Mr. Mosely was formerly managing director of the Koffyfontein Mines, and his name will be familiar to our readers. Mr. Litkie spent many years in South Africa, and was at one time connected with the Diamond Syndicate.

* * * *

The Year with the Rand Klip, Ltd.

The directors' report on the Rand Klip for the year ended 30th June, 1915, to be submitted at the fifteenth ordinary general meeting of shareholders on November 3rd, shows that the capital of the company remains at £475,000, divided into 475,000 shares of the nominal value of £1 each, of which 432,336 shares have been issued, fully paid, and 42,664 shares are in reserve. The property consists of the unproclaimed farm "Klipfontein" No. 22, in the district of Boksburg, in extent 3,451 morgen 82 square roods. The available cash at the close of the year was £15,344, after providing for sundry creditors. The revenue amounted to £1,476, and the expenditure to £1,397, leaving a small surplus of £79. The property has been in the charge of a caretaker throughout the year. The report adds:—"Owing to the conditions of the financial market it has been impossible to bring forward a satisfactory scheme to provide working capital for the further exploitation of the property."

* * * *

Notable Tribute to Underground Manager.

An interesting function, which will appeal to all mining men, took place at a board meeting of the Geldenhuis Deep, Ltd., on 7th September, when a presentation, in the form of a substantial cheque, was made to Mr. George Tucker, the well-known underground manager of that mine. Mr. Tucker, who had been asked to be present at the meeting, was congratulated on having made the important discoveries of reef, the presence of which had hitherto been unsuspected. Recognition of work of this description will no doubt act as an incentive to underground men in their efforts to correlate the various members of the Witwatersrand series.

* * * *

Mashonaland Agency Reorganisation.

The hope expressed a twelvemonth ago of a turn in the tide of the fortunes of the Mashonaland Agency has been effectually dashed by the war, and there is nothing now for it but for the directors to propose a second reconstruction. This is the more disappointing since the Company's gross profits showed further expansion during 1914, having been over £15,000, against £10,000 for 1913. There is, therefore, nominally a credit of £33,500 at profit and loss account, but the directors observe that it will be obvious that none of this balance is available for distribution in consequence of the heavy depreciation which has manifestly occurred in the value of the Company's share investments. On the other hand, the Company is now receiving a substantial and regular income from its investments and land, and it seems desirable and reasonable that this income should be made available for dividend purposes instead of being accumulated as a reserve to cover depreciation. It is proposed, therefore, to write down the existing £1 shares to 10s. each, while the liquidator of the existing Company will retain a balance of cash sufficient to allow of a distribution of 2½ per cent. on the present capital. This will be the first distribution the shareholders have received since the one of similar amount in July, 1911.

* * * *

Gold Fields Rhodesian Development.

Depreciation, which in the balance sheet dated March 31, 1914, stood at £1,402,994 on investments which cost £3,061,941, is shown in the present balance sheet of the Gold Fields Rhodesian Development at £1,416,890. In connection with the present report, however, prices are those ruling at July 27, 1914. Apparently there were no share transactions during the year. The following is a comparison of results shown in the three balance sheets:—

	March 31, 1915.	March 31, 1914.	1913. 14 mths.
Revenue from dividends, etc.	£79,100	£130,679	£98,307
Net profit	53,106	104,027	67,199
Depreciation	1,416,890	1,402,994	508,296
Advances and loans	500,517	217,886	61,308
Loans to market	17,991	67,536	83,190
Sundry debtors	63,351	55,709	66,889
Cash	10,811	40,714	34,920
Amounts borrowed	452,500	307,500	—
Sundry creditors	24,981	19,742	11,025
Contingent liabilities	22,780	83,473	358,185

In order to assist the subsidiaries, the Gold Fields Rhodesian has had to increase its drafts on the Consolidated Gold Felds, but as several of the companies have now overcome initial difficulties and dividends are being paid, the financial position should now improve. The Gold Fields lent £422,000, but this is now being paid off, and it is anticipated that during the current financial year a substantial reduction will be effected. The slow progress made by the companies under the control of the Gold Fields Rhodesian is attributable largely to metallurgical difficulties against which the technical staff have had to contend. The problem seems to be now either overcome or in a fair way of solution. The difficulty at the Falcon is in connection with the extraction.

* * * *

Transition in Metallurgy.

The present era is one of frequent and rapid changes in metallurgical practice. During the last three years—and this very likely will be repeated during the next three—processes have risen into prominence, enjoyed a superlative day and then begun to wane. If the prognostications of some of the most highly skilled of our metallurgists are to be credited, says the *Engineering and Mining Journal* of New York, we shall soon begin to characterise the process of acid leaching of copper as the brightest and most transient of all the metallurgical stars. Because of practical necessity for a treatment system to fill in the bare places left by the better-known ones, leaching seemed to spring full-grown into being. Colossal plants have been built for its practice, but before even the completion of the greater plants a sturdy opponent has appeared to seriously question the economy of their working. Advocates of flotation maintain that there is no place for leaching in the copper field and that all that can be hoped for through leaching can be obtained with less cost, both of operation and of installation, through some flotation system. Whatever may be the truth of the matter, the fact remains that hardly any system of metallurgy—at least so far as wet treatments are concerned—is so firmly founded as to be able to disregard the advances of some other system. In Utah a highly economical system of roasting has made the return of chlorination possible. Even the cyanide process is challenged by flotation, and while not likely to be entirely supplanted, part of its field may easily be pre-empted. As to other processes, they are so many and so varied that it would be difficult to enumerate them, while the various combinations of two or more of them are almost without number.

* * * *

A Coal Experiment.

Among the commodities the supply and cost of which have been largely affected by the war coal is, perhaps, one of the most important. The immense supplies of Welsh coal required for the Imperial Navy have necessarily restricted supplies in other quarters, and among the users of Welsh coal who have felt the strain are certain railway organisations, says the *S.A. Railway and Harbours Magazine*. Included in these are the Sudan Railways, which up to the present have used Welsh coal for locomotive purposes. The difficulties occasioned as a result of the war have suggested the possibility of obtaining coal supplies from elsewhere, and an interesting experiment is now being made with the object of arranging for a supply from South Africa. With this idea in view, a steamer laden with coal recently left Delagoa Bay for Port Sudan, and if, after a test of the coal, the trial shipment is successful, arrangements for a regular supply will probably follow. Some changes in the firegrates of the locomotives will be necessary in order that Transvaal coal may be used, and the mode of firing is, of course, different to that in use where Welsh coal is employed. To assist in the arrangement of these necessary preliminaries, the services of a S.A.R. locomotive inspector (Mr. A. M. Henderson) have been loaned to the Transvaal Coal Owners' Association, who are responsible for all expenses incurred. Mr. Henderson sailed for Port Sudan last month, and on arrival will proceed to Akbara Junction, where the workshops of the Sudan Railways are situated. It is possible that if the experiment succeeds on the Sudan Railways the use of Transvaal coal may also be arranged on the Egyptian State Railways, and these enterprising efforts to extend the use of South African coal in Northern Africa will doubtless be followed with much interest.

* * * *

The War and American Trade.

As representative of the general manufacturer, Mr. W. L. Saunders, chairman of the board, of the Ingersoll-Rand Company, speaks with authority in regard to the effect of the war orders on industry as a whole. To an *Engineers' Magazine* interviewer recently he said:—"The immediate effect of the war orders has been excellent in every way, and they came at a time when they were badly needed. As I look at it, no manufacturer should accept such orders, except under one of two conditions; he should either be able to take care of all the new work with his existing equipment, or he should receive a price which will enable him to cover all new capital expenditure. This, I understand, has been pretty nearly the universal practice in undertaking the work. So long as it is followed, I can see no possibility of injury in the future. I do not look for any increased volume of sales to Europe after the war is over. I do not think that Europe will be in a position for some time to increase its capacity as a buyer or a seller. As for the demands for materials of construction to replace the destruction due to the war, this destruction is probably far less than commonly supposed. Furthermore, the recuperative powers of a people are under-rated. A few years should see all replacements made that can be made. Consider how San Francisco by her own efforts recovered in a few years from a destruction much greater in proportion to the population involved than the destruction in Europe to-day. We shall enjoy one great advantage after peace is declared, however; that is an increased opportunity to trade in the countries either neutral or not close to the areas of fighting, such as South America, Africa, and Australia. Our goods will have gained a foothold in these markets, and this should not be hard to maintain."

TOPICS OF THE WEEK.

TIN PRICES AND SOUTH AFRICAN TIN COMPANIES.

We are enabled this week to present our readers with advance reports of two leading South African tin companies. The period covered in both cases is that ending June 30 last, so that the effect of the war on operations at the properties is fully shown. In both cases the reports of the consulting engineers are unusually painstaking and informative, and both are reprinted in this issue. Mr. E. J. Way gives us quite a treatise on the Rooiberg position and prospects, and Mr. J. Jervis Garrard discourses on the Swazi Tin operations, which constitute, we believe, a record in point of magnitude for this class of undertaking. Some interesting details of the War and Rebellion are also contained in the report of the manager of the Rooiberg mine, Mr. E. R. Schock, who supplements the dry facts of his official review with a reference to the stirring events of last year. *Inter alia*, he writes:—In reviewing the year's work, it may be pointed out that there have been many adverse influences which unfavourably affected working conditions. The outbreak of the war made a curtailment of operations necessary, and had a disturbing effect generally. This was accentuated by the Rebellion, which was very active in this neighbourhood, and called for precautionary measures being taken to safeguard the company's property. The climax was reached on November 8th, 1914, when a fight took place between the Government forces and the rebels in the vicinity of the mine, which resulted in a complete rout of the rebels. Notwithstanding the general excitement, operations were continued practically without interruption, and no damage was done to the company's property. After the Rebellion the rainy season set in, which brought in its wake an epidemic of malarial fever, which considerably hampered operations. The fever was most acute amongst the native labourers and amongst the residents who do not live in mosquito-proof houses. Since the cold weather set in, however, the sickness has happily abated and more normal conditions have returned. "In conclusion," says Mr. Schock, "it may be stated that the position of the mine is sound, and so long as development and exploration are continued, there is every reason to anticipate further discoveries of ore supplies, and in this respect the prospects are good." In neither Mr. Way's nor Mr. Garrard's report is there any extended reference to the question of the price of tin. As the position in this respect is subject to such sudden fluctuations, doubtless both engineers considered it wiser to leave the matter to be dealt with at the annual meetings by their respective chairmen. It is noteworthy, in this connection, that the *Statist*, in mail week, takes none too rosy a view of the prospects. It says:—"There seems to be an impression that the fall in tin prices has proceeded sufficiently far, and that reasonable probabilities point now to a period of recovery with a moderately improved range of quotations. The outlook, however, is really obscure, for war influences are cropping up in all sorts of unexpected quarters, and are having unforeseen effects upon the trade. For instance, it is very difficult to ship tin now to a number of Continental countries, Scandinavia in particular being markedly under the ban of the authorities; while an entirely unexpected development has been the practical diversion of the whole of the enormous American trade in tin from the London market to the East. . . . The future of the tin market undoubtedly depends very much upon the rate at which American consumption will be maintained. Unless America can keep up a bigger average than that of the first four months of this year supplies may prove excessive, and may bring about a still lower range of values; but it is pretty confidently believed that consumption across the Atlantic will be maintained at a very high level so long as the War lasts. There is one point in considering the tin position which deserves to be noticed, which is that the stocks of tin ore in this country have mounted up considerably during the past twelve months, the reason being, of course, that there is no German outlet now for furnace material, which accordingly all comes to England to find a market. Arrangements are being made for treating large quantities of ore in the United States, but these have not so far reached the practical stage. Germany under ordinary conditions is not only a large consumer of ores, but a large absorber of tin. . . . In so sensitive an article as tin, and one in which supply and demand are usually so nearly balanced, it becomes a matter of considerable importance to determine how far the shutting off of Austria and Germany is likely to cause a radical readjustment of the economical position of the metal. From this standpoint it would appear that caution in taking too strong a view of price probabilities would be quite justified." It is to be hoped that these forebodings have already been discounted by those responsible for the guidance of South African tin companies.

STATE ENCOURAGEMENT TO MINING.

The approach of a General Election makes the moment opportune for again drawing attention to the need for greater State encouragement to mining. No question of mere party politics is involved, for the matter ought to be above and outside party differences; and the moment is seized for representing it simply because legislators are usually more receptive to the claims and desires of the public before an election than after it. A movement, we understand, is afoot to secure the recognition by candidates of the need for reform of the Gold Law, and though this is welcome as far as it goes, the whole matter merits handling on a broader scale. An opportune reminder reaches us by this mail in the form of the annual report of the Director of the U.S. Bureau of Mines, which sets out very strikingly the inequitable treatment which mining there, as here, enjoys as compared with agriculture. The Director says:—"No better illustration could be given of the contrast in the treatment of these two great national industries than the fact that in spite of the lagging behind of the mining industry during the last ten years the Government expended for the reclamation of agricultural lands in the public-land States not only all of the money received from the sale of public lands for agricultural purposes, but also nearly $7,000,000 received from the sale of mineral lands in these States." Among the causes of this lagging of mine development the Director cites the following:—(a) The approaching exhaustion of many of the more easily discovered and richer ore deposits, and the fact that not enough other rich deposits are being discovered to supply ore to replace that now being extracted; (b) the absence of known methods of profitably working many low-grade ore deposits; (c) the wasteful methods now followed in some mining and metallurgical operations, which, although they may bring temporary profits to mine or furnace operators, are reducing the national wealth in a manner that can be remedied only by the discovery and use of more efficient methods. "Of a number of our important mineral resources we have for both the present and future needs of the nation only one inadequate supply. The utilization of certain of these resources, such as coal, oil, and natural gas, destroys them. Common prudence demands, therefore, that through the necessary researches the nation should learn how to use this one supply of its mineral resources more wisely and more efficiently." The report proceeds:—"The conditions underlying agricultural progress differ as to many details from those associated with mining, but the broad general principles of progress are the same, and the favourable response to the national aid for agriculture is itself an evidence of the favourable result that can be depended upon if similar aid is extended to mining. Furthermore, the less extended actual experience growing out of the more limited expenditures through the United States Geological Survey and the Bureau of Mines on behalf of the mining industry furnishes specific evidence of the larger benefits that may be expected to result from larger expenditures for mining investigations. Thus, under the Bureau of Mines, through a small expenditure, the saving in national wealth through stopping the waste of natural gas in one and one-half years has aggregated more than $15,000,000, which is several times the total cost of the maintenance of the Bureau of Mines from its beginning. The benefits that may be expected from more liberal aid to the mining industry will come (1) through a better safeguarding of the health and lives of those engaged in mining and metallurgical operations; (2) through the lessening of the unnecessary waste in the mining and treatment of the various mineral products; (3) through increased efficiency in mining operations by the improvement of health and safety conditions (4) through the development of more efficient and cheaper methods in the treatment of low-grade ore deposits, which are either not now worked at all or worked only in their richer parts or pockets. These benefits may come either through the discovery of new methods in connection with the researches of the bureau itself or through its activity in stimulating researches by private parties." Dealing with the reasons why the mining industry has received relatively so little national aid, the report says:—

> Agriculture is much the larger of the two industries; it embraces a large number of persons, more widely distributed, and each acting as an independent agent. Its products, supplying the country with food and clothing, bring this industry even closer to the lives of the people than does the mining industry, though the latter supplies them with the fuel that cooks their food, heats and lights their houses (which are built largely of mineral products), operates and supplies a large share of the materials and all the machinery of their factories, conducts and operates largely their facilities for transportation and communication, and supplies more than 60 per cent. of the total freight tonnage of the country. Indeed, the mining industry is in large measure the real basis of our modern civilisation and national life. But, more than the above, there must be some special reasons why the mining industry has received relatively so little aid from the National Government, and these are to be found, no doubt, in certain misapprehensions concerning the industry. Mining is usually regarded as an industry comprising the operation of a few large, highly profitable properties. It is usually considered to be an industry controlled by a few parties, the owners of the large properties mentioned, who would gladly avail themselves of an opportunity to unload on the Government the cost of conducting those researches in which they are particularly interested. Therefore, it is usually considered as an industry that should be allowed, and even required, to take care of itself. These assumptions are far from correct. The facts of the situation are: (1) These large, highly profitable properties are few in number, and, so far as known, their owners have never joined in a request for Government appropriation to aid the mining industry. These mine owners have neither asked for assistance nor have they endeavoured to unload upon the Government any investigations of their own. On the contrary, at the request of the Bureau of Mines, a number of them have expended considerable sums from their own funds for investigations that promise to be useful not only to them but to other less important mining developments in which they are, and were, in no way interested. (2) Although the number of large mines is small, there is a large number of small mines. Few seem to appreciate the importance of helping those who hold these small properties to find methods of operation by which the properties can be worked at a profit instead of being helplessly transferred to a few large corporations which alone may have the funds for developing the processes that will make profitable operation possible. (3) Another important end to be sought through these larger contributions to the aid of the mining industry is helping the consumers or users of mineral products, who are distributed throughout every part of the country. Mineral products are becoming more and more indispensable to the domestic life of the people and to our manufactures, as well as being the basis of transportation facilities and of the products to be transported. Under normal conditions, as our mines become deeper and our mineral resources are depleted, not only the hazards of production but also the per capita cost of mineral products is increasing, and one important purpose of the larger investigations proposed in behalf of the mining industry is to find how the cost to each consumer may be kept down to a minimum.

Similar testimony to the practical value of the mining industry, as exemplified in Rhodesia, is afforded by some significant comments in the *Bulawayo Chronicle* just to hand. "It is doubtful," remarks our contemporary, "whether the public generally recognise what the mining industry is doing for Rhodesia in these days of difficulty. In the earlier days of its history due credit was given to it for what it was doing for the country, and it was well understood that the only capital that was then available was put up by speculators and others for the risks of mining ventures. Of recent years, however, no good word of any sort has been heard on behalf of the mines. Every man's hand seems to have been turned against them, and we have been urged by all and sundry, including many who have been living entirely, if indirectly, on the industry, to believe that the mines were of no particular account to the country any more; that they were established, and could now be bled to any extent." This sort of thing is not confined to Rhodesia, as we are being again reminded in connection with the forthcoming election campaign. "Farming," the paper tells us, "was *the thing*." the public were encouraged to believe in, and various unsuccessful schemes were entered upon. "Meanwhile, while all these doubtless well-meant experiments were going on, the mining industry was not only neglected and allowed to languish, but sacrificed to railways, royalty and politics, with a result that several mines which would have been equipped and producing gold to-day are lying idle in charge of caretakers, and as most of them require special plants, which cannot possibly be obtained till the end of the war, they will remain in this state till well after the cessation of hostilities." The circumstances complained of in Rhodesia are attributed to undue optimism in regard to the prospects of agricultural development, leading to a volume of production from the land, of one sort and another, for which, under existing circumstances, no adequate market can be obtained, unless, indeed, the farmer happens to be "near a working mine, where he is able to sell his mealies, milk, butter, and vegetables to both whites and natives, and hire out transport, cut fuel, and carry out many other jobs. There he has learnt the meaning of the words 'to be in clover.'" "What is left to us?" asks our contemporary, and answers: "Only the mining industry. On this it may safely be said the whole country has been living during the past twelve months, for practically no outside capital has been brought into Rhodesia during that period. But for the mines the railways might at once be shut down, for there would be neither goods nor passenger traffic. The revenue collected by the Government, the store, claim, site and other rents, by the B.S.A. Company, are all derived through the result of mining operations. The whole population of the country is living directly and indirectly off the mines. But for these we people in Rhodesia to-day could only carry on by taking in each other's washing. We have no hesitation in saying that were they to close down the country must follow suit. The mining industry is unquestionably bearing the whole burden of keeping Rhodesia going on its shoulders to-day, and it seems abundantly clear that it is the duty of the Government, the B.S.A. Company, and everyone else, to help this industry by every possible means, for on it alone the country must depend till well after the end of the war." There is a moral here which the prospective Union legislators may well take to heart.

Rhodesia Copper.

For the year ended May 31 last the shareholders of the Rhodesia Copper and General Exploration and Finance Company, Ltd., have to go without a dividend (against 3 per cent. for 1913-14), but it should be some consolation to them to learn that the directors have drawn only 50 per cent. of their fees for the period, and have waived their claim for the balance. Owing to a falling off in dividend and other receipts, no doubt due to the war, the profit was under £5,900, against over £9,000 for the previous financial year. There is a balance of £7,100 to be carried forward. The cash surplus at May 31 last was, however, substantially lower on the twelvemonth, namely, £31,500, against £45,750. This is no doubt due to additional purchases during the past year, the investments being now entered in the balance sheet at £197,900, as against £187,000 at end-May, 1914. The company's representative in Northern Rhodesia reports it has not been possible to complete the survey of the Big Concession or of the remaining 40,000 acres of farm land, as, owing to the war, the services of a reliable surveyor are not available. He also advises that the proposed construction of the Sinoia-Kafue Railway is in abeyance, and that nothing further has been done by the Government in the matter of putting stern wheel steamers on the Kafue River.

OIL PROSPECTS IN PORTUGUESE EAST AFRICA.

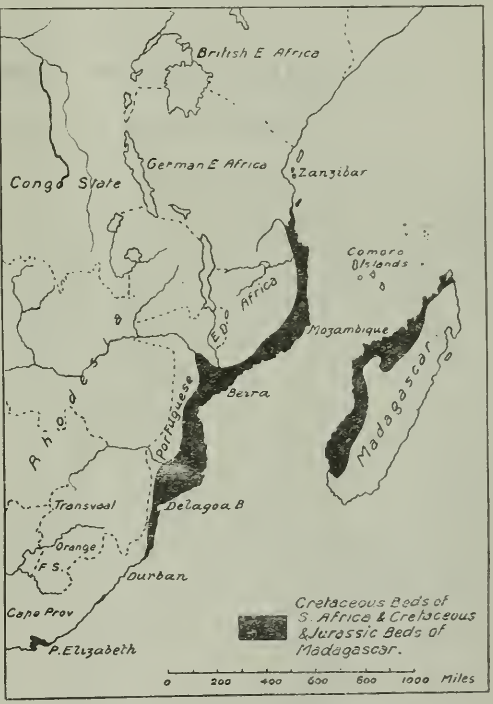
The Primary Essentials of an Oilfield—Cretaceous Rocks in South Africa—Coastal Development of the System.

By J. E. Mills-Davies.

In the search for petroleum, whatever theory be held as to its origin, there are three points to be considered, as Mr. Cunningham Craig concisely puts it, in his report on the "Petroleum Prospects of the Union of South Africa," viz., (1) the presence of sufficient carbonaceous material from which oil can be formed; (2) the conditions of deposition; and (3) the geological structure. "In a locality where these three conditions are favourable," he adds, "an oil field can be predicted with certainty." These conditions were not found to be satisfactorily fulfilled in any part of the Union, but only to a modified degree in the folded belt of the Karroo system along the southern edge of the area occupied by those rocks. Strata which presented many favourable characteristics were the Uitenhage Beds, or Lower Cretaceous Series, near Port Elizabeth. The absence of satisfactory structure in the way of anticlines, however, made it a highly speculative undertaking to drill a hole in these beds in order to obtain evidences of petroleum. It was carried out, nevertheless, by a local syndicate some time before Mr. Cunningham Craig's visit, and the borehole, which was put down to a depth of 3,620 feet, passed through at least 3,400 feet of Uitenhage Beds before entering into the older strata of the Cape system. The other comparatively small areas of Cretaceous rocks in the Union, including those along the coast of Zululand, were not visited, as there was no evidence to show that the conditions there were in any way more favourable than in the neighbourhood of Algoa Bay. Mr. Craig, describing the Uitenhage Beds, says that they are a typical estuarine and littoral series, plant remains and fossil wood being common at some horizons, while thin marine beds with a marine fauna are intercalated with the more characteristic deltaic deposits." The conditions of deposition indicated are very similar to those under which many an oil-bearing series has been formed in other parts of the world, and the description given by him may be applied in a general way to all the cretaceous strata along the South African littoral. In his little book on "Oil Finding" he remarks: "If oil is to be drilled for, it is as well to look for it as near as possible to areas where the conditions for its formation were favourable. On the one hand may be littoral and terrestrial beds where the carbonaceous phase is in evidence, on the other marine beds beyond the confines of the delta. Somewhere between we may hope for an area where the necessary alternations of arenaceous and argillaceous sediment are present, an area not too far from localities where accumulations of vegetable matter have probably been formed, buried, and sealed up. In that area we must seek for favourable structures to concentrate and retain the petroleum." The Cretaceous beds of South Africa exhibit these features of lateral variation very prominently, and whether regarded as the sources of oil-forming material of any organic kind, or with reference to their capacity to act as reservoirs of petroleum, are just such as would meet the specified requirements. As far as the Union is concerned, however, there is no evidence of the existence of petroleum or its allied compounds in any of the Cretaceous exposures that have been examined, and this fact may be ascribed partly to the small extent of ground covered by the outcrops of the system, but mainly, no doubt, to the absence of anticlines or suitable structures to serve as traps for any oil that may possibly have been formed.

Cretaceous Rocks in Portuguese East Africa.

Although the Cretaceous system has not been largely developed, apparently, in the Union of South Africa, it occupies a vast extent of country in Portuguese East Africa. Whereas the greatest distance across the beds of this system at their widest part in Zululand, from the sea to the foot of the Lebombo Mountains, is not much more than about fifty miles, the area continues to expand northwards until it reaches a width of about 200 miles in the district of Inhambane. Still going northwards, towards the Sabi River and through Sofala, Beira, and the districts beyond them, the system is found to cover many thousands of square miles of low-lying coast land, stretching from the highlands to the sea. On the opposite shore of Madagascar Cretaceous rocks are again in evidence. In his interesting paper on "Post-Jurassic Earth Movements in South Africa," contributed to the *Geological Magazine* of December, 1912, Professor E. H. L. Schwarz remarks:—"In Madagascar, on the west, there is a complete conformable series through the Juras and Cretaceous to the Tertiary, and the tilting of these beds westwards connects the beds so tilted with the faulted strata in Cape Colony. It should be noted that at this time Madagascar was in all probability joined to the mainland by a land bridge through the Comoro Islands, and in the bay between the island and the mainland the complete conformable series of rocks above-mentioned were laid down." The time spoken of was just before the period when the great series of earth movements occurred which faulted down the east and south-east coastal regions and lowered the old Madagascar ridge. Evidently,



Sketch Map of Cretaceous Areas in South-East Africa.

then, the Cretaceous rocks, which are so scantily represented in the Union, were originally deposited over enormous areas around the coast, and the great development of these beds and those associated with them in the geological succession on either shore of the Mozambique channel goes to prove that the deposition must have continued during long ages. In some parts of the Union the lower portions of the system are preserved, while in others, for instance in Natal, the upper series alone are found lying unconformably upon the more ancient formations. Very little is known of the complete stratigraphical record, and it is impossible to say whether sufficient geological data exists, either in the Union or in Portuguese East Africa, for the purpose of constructing such a record. Referring to the Umtamvuna, or upper Cretaceous series, from near the eastern boundary of the Cape Province to St. Lucia Bay in Zululand, Hatch and Corstorphine observe, in "The Geology of South Africa," that: "The beds are unconformable to the older formations, and there is no evidence that the Uitenhage series anywhere underlies them. It appears, therefore, as if the coast of Natal and Pondoland had only been submerged towards the close of the Cretaceous, at a time when the coast around Algoa Bay was above sea level, its submergence having occurred during an earlier part of the period." On the other hand, it is possible that the Umtamvuna series really overlap the older or lower Cretaceous series in the areas mentioned, and constitute merely the fringe of a much thicker section that may be found under the sea to the east. Where the upper Cretaceous areas have invaded the land to a greater extent, as in Portuguese East Africa, it is not at all improbable that a fairly representative section of the whole system may be proved to exist somewhere between the western margin of the beds and the sea, in the same way that marine sediments, ranging from the upper Cretaceous to middle Tertiary, none of which seem to have been found in the Union, are known to exist in the Sheringoma Plateau between Beira and the lower Zambesi. The point which one wishes to make, to put the matter briefly, is that there is in Portuguese East Africa a wide region of terrestrial, littoral, and marine sediments which are favourable to the existence of large accumulations of organic material, largely of the vegetable kind, and that we have thus fulfilled one of the essential primary requirements of an oilfield. Questions of structure and rock texture are further important subjects for consideration, for without suitable conditions for the accumulation and storage of the oily products of distillation the other facilities are of little avail.

THE "SAFETY FIRST" PRIZE SCHEME.

Further Details of Offer—The Mine Accident Rates.

SOME account was given in our last issue of the prize scheme instituted by the Rand Mutual Assurance Company for Rand gold mines. It has further been decided that the competitions will be free to those mines which are members of the company. Those mines which are not members are, however, invited to take part in the competitions, provided they agree to contribute a proportion of the expenses of the competitions. Any non-member mine which desires to compete for the prizes will be asked to give an undertaking to contribute a share of the expenses in proportion to the number of underground employees engaged. The company has agreed to finance the prize scheme for three years, the continuance of the competitions beyond this period being dependent on the success and popularity of the competitions. The sole decision as to any matter in connection with the competition is vested in the sub-committee, of which Mr. R. N. Kotze, the Government Mining Engineer, is the present chairman. The following list of mines has been tentatively divided into classes by the Rand Mutual, showing the average number of underground employees, whites and coloured, and the underground accident death rate per 1,000 for the years 1912, 1913 and 1914, on each mine.

LIST OF WITWATERSRAND GOLD MINES DIVIDED INTO THREE CLASSES.

AVERAGE NUMBER OF UNDERGROUND EMPLOYEES (WHITE AND COLOURED) AND UNDERGROUND ACCIDENT DEATH RATE ON EACH MINE FOR THE THREE YEARS 1912, 1913, 1914.

CLASS (A), UNDER 1,500 EMPLOYEES.

	No. of Underground Employees.	Underground Accident death rate for 3 years
Modder Deep Levels (milling December, 1914)	558*	7·77
Meyer and Charlton G.M. Co.	711	3·75
New Unified Main Reef G.M. Co.	791	·42
May Consolidated G.M. Co.	796	4·19
Durban Roodepoort G.M. Co.	834	1·20
Glencairn Main Reef G.M. Co.	844	5·53
New Heriot G.M. Co.	987	2·36
Ginsberg G.M. Co.	1,000	8·33
Aurora West United G.M. Co.	1,065	3·13
Luipaardsvlei Estate G.M. Co.	1,118	2·39
Government G.M. Areas (milling Oct., 1914)	1,124*	16·02
Geduld Proprietary Mines	1,127	4·73
New Rietfontein Estate G.M. Co.	1,162	3·34
Vogelstruis Estate and G.M. Co.	1,194	4·19
New Primrose G.M. Co.	1,199	1·67
Van Ryn Deep (milling July, 1913)	1,336*	5·99

*Competition I. only.

CLASS (B), FROM 1,500 TO 2,500 EMPLOYEES.

	No. of Employees.	
Main Reef West	1,527	6·11
Knight Central	1,638	3·26
Modderfontein B. Gold Mines	1,655	3·22
New Goch Gold Mines	1,670	4·19
Consolidated Main Reef Mines and Estate	1,679	2·38
Van Ryn Gold Mines Estate	1,871	1·78
Wolhuter Gold Mines	1,914	1·22
City and Suburban Gold Mines and Estate	1,942	3·26
Princess Estate and G.M. Co.	2,017	4·46
Witwatersrand G.M. Co.	2,029	7·06
Village Main Reef G.M. Co.	2,179	3·67
Roodepoort United Main Reef G.M. Co.	2,196	7·74
Durban Roodepoort Deep	2,203	4·24
Bantjes Consolidated Mines	2,345	2·84
Simmer and Jack Proprietary Mines	2,432	6·99
West Rand Consolidated Mines	2,448	2·59
Witwatersrand Deep	2,497	5·87

CLASS (C), OVER 2,500 EMPLOYEES.

	No. of Employees.	
Consolidated Langlaagte Mines	2,500	3·47
Robinson G.M. Co.	2,509	5·45
New Modderfontein G.M. Co.	2,518	3·84
Robinson Deep	2,664	3·38
Village Deep	2,762	4·71
Ferreira Deep	2,771	3·37
Brakpan Mines	2,944	4·08
Simmer Deep	2,978	6·16
City Deep	3,224	9·30
New Kleinfontein	3,345	2·79
Langlaagte Estate and G.M. Co.	3,359	4·47
Knights Deep	3,493	4·01
Nourse Mines	3,525	4·35
Rose Deep	3,859	2·85
Geldenhuis Deep	3,961	4·71
East Rand Proprietary Mines	10,415	7·11
Crown Mines	10,494	4·54
Randfontein Central G.M. Co.	18,380	4·33

Brakpan Mines.

The following information in regard to the August output is officially supplied:—Stamps working 140, running time 28 days; ore crushed, 64,200 tons; tube mills working, 10; ore hoisted, 71,263 tons; ore from dump, nil; waste sorted, 12·44 per cent.; fine gold declared, 21,002·21 ozs.; value declared £88,417, equal to 27/6·53 per ton milled; working costs £55,605, equal to 17/3·87 per ton milled; working profit £32,812, equal to 10/2·66 per ton milled.

MINING CONDITIONS ON THE RAND.

By W. L. HONNOLD.*

Owing to a unique labour situation and other unusual circumstances, the mining methods of the Rand are hardly comparable with practice elsewhere. They are of considerable interest, however, and their importance is increased by the magnitude of the industry with which they are identified, gold of $166,186,000 value, say 40 per cent. of the world's production, having been recovered from 25,701,954 tons of ore milled in 1914. In the sketchy remarks to follow, attention will first be drawn to some influential factors of general bearing, after which certain features at two mines of the writer's group will be referred to. It is hoped that engineers associated with similar or different conditions and practice will contribute to broaden the discussion. Before proceeding, recognition is due the generous assistance of C. E. Knecht and F. A. Unger.

GENERAL OBSERVATIONS.

The principal mines are situated along the northern limit of an irregularly shaped geological basin, and extend in almost unbroken continuity over a distance of about sixty miles. As the boundaries are defined by vertical planes there are both "outcrop" and "deep-level" properties, all differing in size and in technical features. So much has been written in regard to the geology of the Rand that only a few pertinent features need here be recalled. Briefly, the ore deposits are profitably enriched portions of certain conglomerate beds or "reefs," rarely more than three, which are interposed between quartzite, or quartzite and slate, and lie so closely together that where more than one are mined they are dealt with as a working unit, although they may be stoped separately. Their collective extension is locally referred to as "the Reef." Along the outcrop the series dips more or less steeply, and in depth it flattens, the latter tendency being most marked in the Far East Rand, where the bottom of the basin is nowhere so deep as to be inaccessible. Dykes and faults are a common feature throughout. They are, however, so well understood as seldom to involve mistaken procedure, although they may occasion delay and added expense. The pebbles are mostly of rounded quartz, averaging perhaps less than an inch in diameter, cemented together by a fine-grained quartzitic matrix of metamorphic character. Sedimentary inconstancies, including partings of quartzite are in evidence, and more or less pyrite is interspersed, which may or may not be appreciably auriferous. Native gold occurs in varying amount, constituting on the average perhaps more than half the assay value of the ore-bodies. In the matter of thickness the reefs show distinct local irregularity, and differ as to individual tendency and as to the common tendency at particular points. In places they are only a few inches thick, sometimes narrowing to a scarcely perceptible seam with or without scattered pebbles, while in other places they exceed a thickness of 10 ft., a rough average being, say, 33 in., which may or may not include quartzite partings. Thickness, however, is of secondary importance and may be offset by assay value. Hence the common adoption of the "inch-pennyweight" as a unit of measurement, from which the still more significant factor of "value over stope width" may be derived in accordance with the apparent breaking conditions of the locality.

VARIATIONS IN ORE BODIES.

The ore deposits separately considered vary as to occurrence, structural features, and internal and relative enrichment. Along the outcrop the more favoured mines have practically no barren territory; in fact, in the Central Rand, where enrichment is unusually persistent, the "leader" has been almost continuously stoped over a length of about five miles in the upper workings of several adjoining mines, and on the dip more or less to about 7,000 ft., the deepest development being of a reassuring nature, as will be clear from the subsequent reference to the Village Deep mine. At other mines, and characteristically in certain districts, the bodies, although smaller and erratically disposed, are large enough to be stoped separately, and are so frequently recurrent as to insure fairly stable working conditions. There are also places where considerable areas are rendered profitable through the prevalence of interspersed minor points of enrichment; in other words, the reef is "patchy" but can be worked to advantage as a whole. Somewhat similar irregularity is observable in depth, and, although local circumstances may justify considerable confidence, there is always a measure of uncertainty as to the outcome of deeper development at any particular point. Apart from the irregularity last referred to, it is noticeable in the deeper workings of to-day that the ore is largely confined to a single reef, and that where the conventional series is present the Main Reef Leader is the more persistently enriched. A corresponding tendency is also revealed in the Far East Rand, where the gold is associated with a somewhat different geological sequence, several reefs being more or less profitably enriched near the outcrop, but only one to a considerable extent in the deeper mines.

VALUES IN DEPTH.

As to enrichment in depth various views have been expressed, influenced perhaps by dissimilar experience, and reflecting probably different standards of comparison. It seems sufficient in the circumstances merely to state that, in the writer's opinion, the average quality of gold per unit of reef area lessens in depth, and the ore deposits show more instances of lower than of higher grade. Decreasing average grade, however, is not the only factor involved, nor is it of the relative importance usually assumed, as will be inferred from the following references to deep development in the two more prominent districts. The Village Deep mine, located in the Central Rand, has at a horizontal distance of about 7,000 ft. from the outcrop reached a vertical depth of 4,600 ft., the dip in the lower levels averaging nearly 40 deg., with a steepening tendency. Although the tenour of enrichment is inferior to that of mines nearer the outcrop and the South Reef is of decreased importance, the development on the Leader in the lower levels still discloses practically continuous ore, of good stoping width and of better than the average grade of the mine, for over 5,000 ft. along the strike, the full extent in this direction, as well as in depth, being still undetermined. In the Far East Rand, Brakpan Mines has reached a vertical depth of 4,100 ft. at a distance of nearly four miles from the outcrop. The formation, therefore, has flattened, local dip averaging about 7 deg., and the tonnage per claim being accordingly reduced. Only the contact reef, lying at the base of the series on a slate footwall, is of material importance, and of its total tonnage about 50 per cent. has so far been of profitable grade. The ore-bodies are clearly segregated, irregular as to occurrence and shape, generally elongated in the direction of dip, of good thickness, and large enough to be stoped separately, some measuring over 700 ft. along the strike and more than 4,000 ft. on dip. Although they vary in the matter of enrichment, both internally and comparatively, and show a general tenour below that of neighbouring mines nearer the outcrop, yet their average is approximately that of the Rand of to-day. An even more interesting case is that of Springs Mines in the same district, since its workings are 3½ miles from those of its nearest neighbour and about seven miles from the outcrop, the vertical depth being 3,750 ft. The mine is still in the development stage, but has been laid out on such broad lines as to make the showing of considerable significance. So far, the reef has been opened over an area of about sixty acres, the maximum dip and strike dimensions being respectively 6,200 and 2,500 ft. Characteristics similar to those at Brakpan are disclosed, except that the dip is flatter and that the grade of the ore is exceptionally high, the ore reserve now averaging 10.3 dwts. over an average assumed stoping width of 52 in. The two last-named mines are specially significant because of their bearing on the district offering the greatest scope for new activity. It is, however, because of their bearing on the question of ore deposition at great distance from the outcrop, and their influence on mining methods, that they are now referred to. And it is gratifying to find that, although they may afford less profit per unit of area than some of their neighbours nearer the outcrop, they disclose sound mining conditions and promise to justify the heavy capital expenditure involved. Obviously it is imperative in such circumstances that the surface area be ample and not overvalued, that the shafts be so disposed and the lay-out so conceived as to insure rapid opening in all directions, and that the available capital be sufficient to carry the venture through an extreme phase of poor development or other initial misfortune. Although the three mines mentioned may not accurately reflect all the available evidence as to enrichment in depth, they serve to elucidate the opinion previously expressed and to suggest that the future of the Rand is perhaps more dependent on the quantity than the quality of the ore yet to be developed. The reefs generally, as well as the associated quartzite in somewhat less degree, are above the average of vein quartz in hardness, and the formation is notable also for its cohesion and tenacity. In depth these characteristics are partly neutralised by increasing pressure. It is probable, however, that any consequent advantage to stoping is more than offset by the accentuated weakening influence of dykes and faults and the decreased labour efficiency due to higher temperature and greater humidity. There is, as a rule, but little underground water, and, on the whole, working conditions are comparatively favourable.

ECONOMIC FACTORS.

Some outstanding correlative factors will now be referred to. Imported supplies are expensive owing to the high rates of transportation, particularly railage. Imported timber costs about $1 per cubic foot, drill steel about $150 per ton, and other imported items are proportionately costly. Explosives, locally manufactured of imported material, are on the basis of $7.33 per case for gelignite containing 60 per cent. of nitroglycerin and $10.33 for 92 per cent. blasting gelatin. For inferior mine timber of local growth about 32c. per cubic foot is paid. Water for industrial purposes is pumped to some extent from the mines, but mainly from surface dams at small cost, and in exceptional cases is purchased from the Rand Water Board at 80c. per 1,000 gal., which is also the rate for the domestic supply. In the matter of power, the Rand, apart from the cost of plant, is fortunate. Local coal of about 12.5 lb. bomb test is delivered to individual mines at an average of about $2.80 per ton, and to centralised power stations at an even cheaper rate. The latter are important factors in the situation, as is shown by the fact that the principal company is now distributing about 460,000,000 units of electric power over 224 miles of primary transmission line, and 120,000,000 units of compressed air through thirty miles of primary piping. Its charges are on the basis of electric power and average about 1c. per kilowatt-hour. Consequently, the cost of hoisting, pumping, machine drilling, and ventilation is fairly low. The importance of ventilation and the allaying of mine dust by means of spraying devices has become increasingly apparent in recent years, and the quality of the underground air is now much better than formerly. It is hoped that the measures adopted, coupled with the wider use of hollow-steel drills and greater precaution on the part of employees, will materially improve the position as to phthisis, the economic significance of which is indicated by the fact that about $3,000,000 per annum is now paid in compensation and about $50,000 for the maintenance of a sanatorium. Only a few words seem called for on the subject of labour. Broadly speaking, white employees do but little actual work, their function, which they jealously guard, being to supervise the tasks of the natives. The latter are of various African tribes, differing more or less as to minor characteristics. Generally, they are tractable and fairly dependable, but deficient in dexterity and initiative. They are averse to continuous employment and come to the mines for comparatively short periods, the average stay being about seven months. Hence their progress as workmen is not sustained, and standards of efficiency are low. Some, of course, are of exceptional character and capacity, and, as a whole, they may in time show greater proficiency than is so far evident. It has to be borne in mind, however, that white labour is unsympathetic to native advancement, and that owing to this restrictive influence radical change in labour conditions is improbable, or at least so speculative a matter as to be beyond the scope of the present paper. The relationship between the two classes of labour will be sufficiently apparent from the context. Underground wages vary for different classes of work, but average about $5 per day for whites and 50c. per day for natives. To the latter rate has to be added about 25c. per day to cover recruiting, transportation, housing, food, and medical attention.

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* Paper read before San Francisco Meeting of A.I.M.E., September, 1915.

(To be continued.)

EFFICIENCY ENGINEERING IN MINES.

By P. B. McDONALD.*

The recent death of Frederick W. Taylor, the originator of efficiency engineering, or scientific management, evoked varying opinions as to whether or not the systems he advocated had succeeded. Not so much is heard of scientific management as was the case four or five years ago, when it first began to be applied to mining. Some mining men still retain their original enthusiasm for the system. Others see good in it, but also see limitations. Still others never cared for its principles. Thus Frank Richards, managing editor of the *Compressed Air Magazine*, speaks of "Taylorism" as one of the fads that the American people seems to require to play with, and he quotes an English authority who styled it "a peculiarly hideous system of dehumanisation." One of the mining regions where efficiency engineering, or "Taylorism," has been given a most thorough trial is the Lake Superior, more particularly in the copper country, where the Calumet and Hecla went into it on an extensive scale, being followed to a lesser degree by the other copper-mining companies, and also by some of the iron-mining companies on the ranges to the south. Efficiency in its every phase was gone into most thoroughly and minutely; drilling, blasting, "mucking," tramming, timbering, co-ordination of work, mechanical aids, improved rock-drills, care of old stopes, disposal of waste rock, tailing, etc. Observers with pencil, paper, and watches standardised all movements of the miners. New varieties of rock-drills of various weights, styles, and with different pressures of air, were tried and the advantages of each figured out. Suggestions were made to a company manufacturing rock-drills toward co-operation to produce a special drill, based upon information obtained from experiments in the copper mines, that would be exactly suited to the conditions and requirements of the tough amygdaloid rock of the copper country and to the abilities of the miners operating it. By carefully trying new methods at the Superior mine and proving them feasible before adopting them at Calumet, it was possible, when some of the old miners at the latter place said, "It can't be done," to bring one or two men from Superior and demonstrate that it could be done. Soon a regular staff of efficiency engineers was on hand in all the Calumet and Hecla mines, many of them college men who had been trained for their work by an apprenticeship at the Superior mine. The results attained were extraordinarily gratifying. In a comparatively few months the cost of driving had been reduced 60 per cent.; the cost of stoping had been decreased a smaller, but an appreciable, amount; timbering and general co-ordination of work had been materially improved. The new one-man drills proved great time-savers and cut costs immediately.

Driving, in its various phases of drilling a set of holes, blasting, and "mucking," offered a favourable opportunity for measuring what each man accomplished, and lent itself to standardisation due to the self-contained and comparatively simple nature of the advance of a drift. The most noticeable gains in efficiency were achieved in driving. Stoping, with the difficulty in seeing and recording just what one miner had done and how much rock he had broken, was less amenable to scientific improvement, and it was found that stoping methods could not be accelerated to the extent possible with driving. But the most decided obstruction to the instant success of the plans of the efficiency engineers was the sullen opposition of a great mass of the miners. They did not like the new "pencil methods" of standardisation, and particularly objected to working alone on the one-man drills. A few converts were made and won over to the cause of progress, but for the most part a stubborn resentment and general dislike against doing things by rote prevailed in the ranks of the thousands of Cornish, Finnish, Polish, and Austrian miners, who distrusted, mistrusted, and did not understand this comprehensive grafting of a standardised and detailed set of rules on what had hitherto been ordinary everyday mining. The efficiency plans that the Calumet and Hecla gradually put into practice were so carefully entered into, so thoroughly worked out, and so systematically administered, that estimates of the amount of money they were going to save in operating ran into the hundreds of thousands of dollars per year. The cost of rock-drills, drill-repairing, and incidentals in general had mounted tremendously, but wonderful reductions in the cost per foot of driving and the cost per ton of rock stoped had been gained, as well as considerable savings in the amount of timber used and miscellaneous economies. Just when scientific management had got into full swing, the disastrous labour troubles came, based, from the miner's standpoint, on antagonism to the one-man drill, to working alone, and to mistreatment by "petty bosses." Whether or not the strike of the copper miners was a direct result of the efficiency engineering campaign is, of course, a matter of opinion. Possibly it would have come about anyway, regardless of efficiency systems. It is likely that the new methods of working had something to do with making it possible for agitators from the Western Federation of Miners to gain a foothold and a following in Michigan. In the end the copper mining companies won, but they lost a great deal of money from the long bitter struggle and expensive shut-down occasioned by the strike. It is not difficult to see that millions of dollars were lost both by operators and men in the weary months of fighting and bad feeling.

In so far as faster rock-drills and superior facilities for repairing them, better co-ordination of the different phases of underground work, and more accurate knowledge of practical mining, have resulted from efficiency engineering in the copper country, the system has been an undeniable success. As to any lasting or consistent speeding of the miners at their work, judges of the situation are not so sure. Averaging losses and gains in the labour element, an unprejudiced outsider could not be certain that the companies have benefited except in the mechanical line, particularly as regards rock-drills and their maintenance, and in better appreciation—on the part of the staff of officials—of the peculiar problems of underground mining. To get a correct valuation of the advantage or disadvantage of efficiency engineering, a long period of time should be considered, so that the effect on the labour situation could be gauged and weighed. Other mining companies in the copper country followed the leading of the Calumet and Hecla, and worked out many economies and imporvements in the standardisation of underground methods. But, like the Calumet and Hecla, they also lost heavily in the strike. On the iron ranges to the south and west, a few enthusiasts in scientific management developed, and the American mine at Diorite, the Munro Iron Mining Co. at Iron River, and even one or two of the Oliver mines on the Mesabi, conducted more or less complete experiments in observing, recording, and systematising underground work. However, the iron operators were too busy with other matters or were restrained by conservative Eastern management, from doing much more than experiment with the new ideas. Some creditable improvements were effected at several mines, such as better provision for getting dull drill-steel sharpened, timber-saving devices, faster rock-drills, economies in distribution and use of dynamite, etc., but scientific management, where known as such, was not persistent to any marked degree on the iron ranges. The individual iron mines merely continued to do commonsense operating, getting out the ore and shipping it, as cheaply and as handily as possible, while keeping all eyes open for wastes and leaks, as has always been done in the ore business of Lake Superior. In the main, efficiency engineering in this region has accomplished a number of economies—mostly mechanical; in its effect on labour the advantage is doubtful, and undoubtedly the disastrous labour unrest was partly due to opposition by the miners to the attempt, by efficiency enthusiasts at standardising and speeding mining.

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* In the *Mining and Scientific Press.*

Nigel G.M. Co.

The returns from the Nigel company's mine for the month of August are as follows:—Tons milled 11,800, yielding 3,581 ozs. fine gold; profit, £55. Reduced returns due to low grade ore and short running time, owing to stoppages for repairs to plant.

THE COLLAPSE AND RECOVERY OF THE BANTJES CENTRAL INCLINE SHAFT.

By PERCY CAZALET and W. W. LAWRIE.*

DESCRIPTION OF SHAFT.

This shaft is the main incline of the property, being situated midway between the east and west boundaries, and started near the South Reef outcrop. The shaft is a five-compartment one, with four skipways and a ladderway, the outside dimensions being 33 ft. by 7 ft. 6 in., and the grade 34½ deg. The shaft pillar is nowhere less than 330 ft. wide, the reefs not being stoped within 150 ft. of the side of the incline or within 200 ft. from the cave. *Plate* 1.†—This gives details of the shaft and equipment, and also shows the steel setts with which the excavation of the shaft was framed. The method by which the tracks are laid on continuous concrete stringers, instead of on timber sills, is also shown; the work of recovery was made much easier on account of having these concrete stringers to work from. The track and stringers were found intact under the fall, although the steel uprights, which were embedded in the concrete to a depth of 14 inches, were bent in places at right angles flat on to the stringers.

GEOLOGICAL FEATURES.

Plate 2 shows two cross-sections through the shaft, and conveys a good idea of the geological features. The large dyke shown has a strike south-west and north-east, and dips at 45 deg. to the south-east. This dyke overlies the shaft at a distance varying from 8 ft. on the east side to 38 ft. on the west. The shaft is sunk practically parallel with this dyke, but slightly flatter than the reef, which latter goes into the foot 160 ft. from the collar. The strata and dyke are oxydised and altered to a vertical depth of 120 ft.—that is, to the plane of the 1st level. The fall broke off at this point, the blue, unaltered quartzite remaining entirely self-supporting. The junction of the "blue" and oxydised zones carried a good deal of water, which increased considerably as the results of the abnormal rains of last year, and this water, of course, added to the difficulties and anxieties of the recovery work in the shaft.

CAUSE OF SUBSIDENCE.

The rainfall for the preceding three years has been much below normal, while from the middle of December to the middle of February of the season 1914-1915 the fall was the heaviest experienced for many years. Up to, and including, the 16th the rainfall for December in this district was 3.28 inches, while on the 17th heavy, soaking rains commenced and continued on the 18th and 19th, the gauge readings being 1.72 inches, 2.05 inches, and 1.14 inches respectively, equal to 5 inches in two and a half days and over 8 inches in eighteen and a half days. On the morning of the 19th the shaft caved. The subsidence was due to the decomposed dyke becoming saturated with water from the heavy rains and being converted into a plastic mud with little or no "internal friction." The whole weight of this saturated mass was thus applied to the capping of sandstone, which forms the immediate roof of the shaft, which latter fractured under the stress, throwing the weight on to the steel shaft framing, which collapsed with practically no warning. The sides of the shaft remained intact and solid, and showed no signs of pressure. It is evident that when these steel setts were designed no great weight was expected, and that they were erected mainly for carrying lagging to frame the shaft and prevent loose pieces of rock from falling into the skipways. Where some weight had evidently been looked for near the contact of the free milling and blue rock the setts had been duplicated, but even these collapsed, as will be seen from the photos. It is possible that had sufficient warning been given we might have been able to prevent the collapse of some of the steel setts themselves by reinforcing them with timber legs, studdles and diagonals, as has now been done in the portion of the shaft which stood (see Photo 1); but from the time when any movement was noticeable on the morning of the 19th until the whole caved area collapsed was only twenty minutes.

EXTENT OF COLLAPSE.

The steel setts totally collapsed for a distance of 95 feet (from 125 feet to 220 feet from the collar of the shaft), while a further 35 feet partially collapsed. The vertical distance from the surface was 65 feet at the top end and 115 feet at the bottom, or, say, 90 feet at the centre of the fall. All the power cables were fractured, as well as the air and water mains. A preliminary examination of the fall was made with the object of determining the best method of attacking and recovering the shaft. It was found that working from below the fall presented difficulties and dangers which we did not feel justified in facing. The two photographs (2 and 3) taken below the fall show the girders and uprights twisted and bent. Had we attempted to cut through any of these it was impossible to tell what strains would be released, especially as we found by tramming from the fall on the first level that the fallen rock was crushed and wet, and would run like mud if relieved. At first the cave was not indicated on the surface, but after hoisting about thirty tons of rotten sandstone from the top edge of the fall soft dyke was exposed, and the cave then extended to the surface, when a cavity 30 feet by 20 feet by 20 feet was formed. This cavity increased in size as the broken rock was drawn off as we advanced through the fall. Our first object being to save the mine from being flooded, and especially the main pumping station on the tenth level, and at the same time to get more information as to the nature of the fall, an attempt was first made to recover the west or ladder compartment. In three days we had advanced 20 feet, when the difficulties met with were so great that we realised we could not hope to get through in time to save the pumps. A winze 85 feet in depth was therefore started from the west side of the shaft, above the fall, to the first level, and a second winze of about 20 feet from the first level into the incline below the fall. These winzes were holed in under three days. Cables and rising mains were then connected through, and the pumps restarted on the morning of the 29th December, ten days after the accident. The capacity of this shaft is such that only two compartments are at present necessary for the handling of all ore and material. It was therefore decided to first recover and timber the two eastern compartments and to equip the winze which had been sunk to the first level as a ladder way, leaving the recovery of the remaining three compartments until the ground had settled and drained, possibly towards the end of the present dry season. In reopening caved areas of any description the removal of the broken rock is the principal factor in the speed of advance. In the initial stages of our work we were much delayed by this difficulty, which was overcome by opening up a rise in the channel between the concrete stringers in the east compartment (the steel girders and lagging of the setts, which were resting on the rails, forming a natural cover), and small curved plates were laid down on the bottom of this rise to form a chute. This work was difficult but when completed made all the difference in the speed of advance.

In order to control the size and amount of rock passed down this chute and thus prevent it from becoming choked, an 8-inch pipe, 9 feet in length, was laid in the chute at the face of the fall, and moved forward as the face advanced, the broken rock being hand fed through this pipe into the chute and carried down with a stream of water. For dealing with material and concrete, as well as for hoisting broken rock, a temporary 3ft. track was laid between the rails of the main track, on which ran an ordinary drill trolley, 7 feet 6 inches in length and 12 inches in depth and 2 feet 9 inches wide. To facilitate discharging the lower end was hinged and fastened by means of a hook and catch pin. For cutting through the bent and twisted steel "setts" the oxygen-acetylene flame was used. The plan was a size 2 Sirius plant. The generator was erected on the surface, the gas being conveyed to the work through a ⅜in. pipe. To save oxygen, the supply of which was limited, the cylinders were brought down when required and placed as near the work as possible. The cutting was done by an apprentice fitter, the time taken to cut through a 9in. by 4in. girder varying between seven and fourteen minutes. The fact that steel had been used for the setts in the shaft added enormously to the seriousness of the work of recovering the skipways, since the steel joists were bent in all shapes and were lying at all angles, and but for the oxy-acetylene flame for cutting through them the job would have taken much longer. There was no room to swing a hammer for cold cutting, and hack-saw cutting would have been very serious indeed, owing to the mud and grit surrounding the joists interfering with the work, while the time taken in rigging and unrigging a mechanical driller would have been enormous. In view of all this, it was fortunate that a sufficient supply of oxygen was ultimately procured to finish the job, but only after ransacking practically all the available supplies in South Africa. From the experienced gained in the preliminary work it was evident that we had to deal with running ground consisting of badly crushed, rotten sandstone, with water-logged, decomposed dyke above, and it was recognised that "spiling" in some form or other was necessary in advancing through the fall. After much thought and discussion it was decided to part from the methods which have usually been employed in work of this kind on these fields, and to adopt the method we had developed while working in the ladder way. This method is really a modification of that employed in tunnelling through loose ground by means of advanced casing pushed forward by hydraulic plant, followed by permanent brick or other casing built up in sections as the work advances. In this example the advanced casing was represented by four to five travelling setts of timber supporting 15ft. lengths of 45lb. rails. These rails were driven forward with 14lb. hammers. As they advanced the broken ground was cleared from under them at the face and a sett of timber erected, the rear sett being taken down.

(To be continued.)

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* Paper read before S.A.I. of E.

† We hope to insert these plates with later instalments of this paper.—Ed.

Glynn's Lydenburg.

The following are the particulars of this company's output for August:—Tons crushed 4,095, yielding 1,733·638 ozs. fine gold; estimated value of month's output, £7,267; estimated profit for the month, £2,985.

THE POSITION OF SWAZILAND TIN, LTD.

Year's Working Profit £14,457—Costs Reduced—Increased Profits from More Ground Treated—Improved Price of Tin.

THE working profit of the Swaziland Tin, Ltd., for the year ended June 30 last amounted to £14,457 3s. 11d. After allowing for Government royalty, expenditure in connection with Zaaiplaats lease and interest charges, and after taking credit for township and sundry revenue, a net revenue of £12,834 4s. 8d. is carried to appropriation account. To this must be added the balance unappropriated at 30th June, 1914, £5,670 16s., and funds transferred £284 2s. 6d., giving a total of £18,789 3s. 2d., which has been dealt with as follows:—Dividend No. 15 of 7½ per cent., £6,150; balance carried forward, £12,639 3s. 2d. The working expenditure and revenue account for the year was as follows:—Revenue: 430·940 tons of tin concentrate shipped, £42,937 7s. 10d. Expenditure: Mine, £24,093 12s. 4d.; head office, £2,338 10s. 5d.; export charges, £2,048 1s. 2d.; total, £28,480 3s. 11d. Working profit, £14,457 3s. 11d. The shipments unrealised at the close of the financial year have been taken into the accounts at a conservative price. The item sundry debtors £4,800 11s. 11d., includes an amount of £4,364 18s. 11d. due in respect of tin sold which was received on the 2nd July, 1915, *i.e.*, two days after the closing of the books. The amount of £1,125 8s. 7d. paid in connection with the Zaaiplaats lease represents the company's proportion, viz., 40 per cent. of the amount spent on the property during the year. There was no return from this venture during the year as no concentrate was recovered for export. Some recovery will be made in the near future, however, as ore from the lease is now being treated at the Groenfontein plant. The total amount which has been sunk by this company in this venture to date is £8,401 4s. 1d., against which a sum of £4,334 5s. 2d. has been recovered, leaving a net disbursement of £4,066 18s. 11d. From the reports of the consulting engineer and manager it will be seen that a greatly increased quantity of ground has been treated, but that the grade was slightly lower due to the treatment, in the ordinary course of work, of considerable areas of ground not included in previous estimates. Owing to a considerable reduction in working costs, the profit on the year's working shows an increase. The low price for tin continued during the earlier part of the year, and in fact for a time it was almost impossible to obtain a price at all. The directors consequently were unable to declare a dividend for the first half of the financial year. Prices, however, improved later, and regular shipments were resumed, enabling a dividend of 7½ per cent. to be declared for the last six months of the year.

In the course of his report, the consulting engineer, Mr. J. J. Garrard, writes, *inter alia*:—

> The working profit for the year was £14,457 3s. 11d., as against £8,400 3s. 4d. for the previous year. A comparison of the year's results with those of the previous year is as follows:—

	1914-15	1913-14.
Cubic yards treated during year ...	961,550	722,014
Cubic yards treated, average per month ...	80.129	60.168
Lb. concentrate recovered per cubic yard	1·004	1·178
Grade concentrate per cent. metallic tin	71·253	71·9
Lb. metallic tin per cubic yard	·715	·847
Average value realised per cubic yard	10·206d.	12·584d.
Average cost per cubic yard	6·597d.	9·792d.
Average profit per cubic yard	3·609d.	2·792d.
Average metal price realised per ton .	£158·763	£157·657

(The costs given include all general charges and head office expenses.)

> These figures show that the amount of ground treated during the year was 33 per cent. more than during the previous year, whilst the cost of working was about 33 per cent. less. Notwithstanding the fact that the value per cubic yard was 18·9 per cent. less than during the previous year the profit shows an increase of 29·2 per cent. It is estimated that 10½ long tons of concentrate were lost through exceptionally heavy floods during December and January. It is interesting to compare last year's results with those obtained for the period October, 1906, to January, 1907—the only period over which comparative figures on the cubic yard basis were kept until the last three years: Cubic yards treated per month, 17,464; lb. metallic tin per cubic yard recovered, 1·87; cost per cubic yard, 20.1d. Considering that work during the past year included a great deal of ground already previously worked, the results may be regarded as very satisfactory. The hydro-electric plant ran well during the year, running time being 95 per cent. of full time, generating 760,534 units at a cost of ·3672d. per unit, including maintenance charges on plant and water race, the load factor being ·4283. The three 8in. centrifugal gravel pumps ran 70·9 per cent. of the time that power was available, elevating on the average 23·6 cubic yards per hour to an average height of 38·6 feet, the average number of cubic yards per unit being ·76, and the average load factor ·82. The cost of renewals on the three pumps amounted to £393, or 5·3d. per running hour per pump, or ·22d. per cubic yard. The cost of repairs amounted to £321, or 4·3d. per running hour per pump, or ·18d. per cubic yard. The total cost, including all general and head office expenses, on gravel pumping operations, amounted to 8·229d. per cubic yard, which includes ·482d. per cubic yard for power. The year's work on these pumps included the dismantling and cartage of two pumps to entirely new sites, and the floating of pumps three times to new positions. The total quantity of ground removed by these pumps amounted to 420.243 cubic yards. The almost continuous working of these pumps (apart from time of removals) was rendered possible by bringing into use a pressure nozzle pump during portions of four dry months when the water supply fell off. The amount of water consumed by monitors in cutting the ground for the gravel pumps was on the average 166·3 cubic feet per minute, at an average pressure of 88·2 lbs. per square inch, to which were added 36·3 cubic feet per minute run in from creeks to assist monitors, whilst, in addition, 12 cubic feet per minute of seepage water were elevated, the total consumption of water per cubic yard elevated being 492 cubic feet. . The average efficiency of the three pumps on the whole year's run was 27·25 per cent., as compared with 24·3 per cent. for the previous year (the efficiency basis being equivalent to the total ft. lbs. of water and solids lifted to the required height, divided by the ft. lbs. consumed in power generated—electrical units in this case, and water in the case of hydraulic elevators—to do the required work; but allowing 35 per cent. for losses in electrical transformation and transmission). The performance of these pumps after two years' constant wear and tear, of the roughest description, in elevating sand, gravel and boulders (up to the size of a man's head) is truly remarkable, the pumps being still in perfect condition. One 12 in. hydraulic elevator has been in use throughout the year at Stable Creek, consuming on the average 1,302 cubic feet of water per cubic yard of ground broken and elevated to a height of 23·3 ft. Of this water 490 cubic feet were required per cubic yard of ground broken down by monitors under 55 lbs. pressure, so that the elevator consumed 62·2 per cent. of the available water (under 55 lbs. pressure) for its own operation, leaving only 37·8 per cent. available for breaking ground. As, however, water is plentiful at this creek, its inefficient use is not of moment; moreover, the total working cost by this method was only 6·276d. per cubic yard, whilst, as pointed out in my last report, this same water has already been twice used for breaking ground in the upper workings of the concessions, and once again for generating electric power, before doing its work at this creek. The average efficiency of this elevator on the whole year's run was 16·58 per cent., as against 15·2 per cent. for the previous year. This elevator accounted for 170.179 cubic yards. It will be seen that the gravel pumps actually did 64 per cent more work than the hydraulic elevator for a given quantity of water power. Three hill creeks were worked by monitors during a portion of the year, the grade being sufficient to dispose of the tailing without elevating. The quantity of water used for this work averaged 219 cubic feet per cubic yard of ground removed at an average pressure of 69 lbs. per square inch. This work accounted for 283,788 cubic yards. The remaining ground, amounting to 87,340 cubic yards, was removed by ground sluicing and handwork and sluicing in small boxes at places where no water under pressure for hydraulicing was available. A total of 1,822,984 cubic yards of profitable gorund was proved by boreholes, showing an average value of 1·44 lbs. metallic tin per cubic yard. In addition to this, there are some 2,597.000 cubic yards of ground in hill creeks estimated from results of past work in the same creeks to be worth ·69 lb. metallic tin per cubic yard, thus making a total of about 4,420,000 cubic yards of an estimated average value of 1·00 lb. metallic tin per cubic yard, which may be considered as practically assured. There is a further extent of tin-bearing ground, amounting to 5,000,000 cubic yards, of which the quantity has been estimated, but the value not yet proved; a considerable portion of this ground lies ahead of the workings dealt with in the above table. There still remains a considerable extent of ground over the enormous area of the concessions which has never been examined at all. The grade recovered during the year from proved ground was considerably below the estimated grade, this being largely due to the treatment of ground, in the course of working, outside the pay blocks as originally estimated, which, although of low value, paid to treat under our present reduced cost of working. Loss of concentrate by serious floods in many workings also contributed to lower the grade recovered. The amount and grade of ground proved by drilling, as shown above, represents a fairly close estimate and indicates ground ahead of considerably better grade than that worked during the past year. Should, however, profitable ground not included in the above yardage be encountered in the course of working, it will of course be recovered, even though its grade may be low, so that it does not follow that the estimated grade will necessarily be attained, though the metal content may in the aggregate be increased. Drilling operations during the year were chiefly confined to testing new ground at Mbabane Flats, and to putting down intermediate holes to obtain a closer estimate of ground previously partially tested. The testing of unproved ground by drilling is being actively proceeded with.

THE YEAR WITH THE ROOIBERG TIN MINE.

Working Profit £29,802—Mr. E. J. Way's Exhaustive Review of the Position and Prospects.

For the year ended June 30th, 1915, the Rooiberg revenue from tin concentrates amounted to £109,249 9s. 1d.; the expenditure on working account was £79,446 9s. 2d. The working profit for the year was thus £29,802 19s. 11d. A further £121 13s. 4d. was derived from interest, etc., making a gross profit of £29,924 13s. 3d., which, together with £22,787 8s. 8d., brought forward from last year, was dealt with as follows:—Interim dividends Nos. 8 and 9 of 5 per cent. and 7½ per cent. respectively, £22,500; expenditure on improvements, £8,292; directions' special remuneration, £1,125; Government taxes, £308; reserve fund, £5,000; carried forward, £15,486; total, £52,712. An amount of £5,000 has been added to the reserve fund; including interest earned, the amount set aside for this fund now totals £20,850. All expenditure upon development and exploration, amounting to £12,693 8s. 8d., has been charged to working costs. The average price of metallic tin, on which the sales of concentrates for the year were effected, was £151, as compared with an average of £174 for the previous year. The following are the results of the year's operations:—Number of stamps, 10; number of days (24 hours) concentrating plant ran, 339·71; ore mined, 24,836 tons; ore taken from stock in bins, 57 tons; ore taken from prospecting dumps, 3,638; waste sorted out (8·62 per cent.), 2,141 tons; ore milled, 26,390 tons; sands and slimes re-treated, 10,873 tons; total treated, 37,263 tons. Concentrates produced, 1,055 long tons of an average grade of 69·28 per cent. metallic tin. It is estimated that there were on hand at 30th June, 7,975 tons of accumulated slimes, middlings, etc., of an average assay value of 2·5 per cent. metallic tin. The water storage reservoir and boreholes have provided an ample supply of water.

In his report for the financial year ended June 30th, 1915, Mr. E. J. Way, the Consulting Engineer, writes:—The following are the principal matters of interest with which I propose to deal: (1) Results of operations, 1914-15, as compared with the results of the previous three years. (2) Ore reserve position. (3) Percentage of extraction of metallic tin. (4) General position and prospects of the company. 1. Results of operations, 1914-15, as compared with the results of the previous three years. The following table shows the principal results of working of the past four years:

	1911-12.	1912-13.	1913-14.	1914-15.
Tons milled	20,799	35,917	40,643	37,263
Long tons M.T. produced	536.2	831.7	886.6	730.9
Revenue per ton	£5 1 7	£5 2 11	£3 15 3	£2 18 8
Total working costs per ton	£3 10 1	£2 13 10	£2 7 9	£2 2 8
Total working profit	£32,721	£88,193	£55,805	£29,802
Grade of ore milled (M.T.)	4.94%	3.56%	3.181%	2.82%
Percentage extracted	*57·97%	†72·85%	†78·81%	†78·27%
Average price at which M.T. sold	£197	£218	£174	£151

In four years working costs have been reduced by £1 7s. 5d. per ton, and the extraction of the metal has improved 20·3 per cent. With regard to working costs, it must be borne in mind that during part of the year expenditure on development and exploration, which is charged to working costs, was considerably curtailed. With regard to extraction, this shows a very slight falling off, but had no special efforts been made to safeguard these results the falling off would have been much greater, as the majority of the metal obtainable from the Union Lode is exceedingly fine and somewhat more difficult to recover as depth increases. Metallic tin in the above table is given in long tons, as the buyers deal in long tons. *Only current ore was treated. †Sands and slimes are included which had been treated previously in the old mill. In October, 1913, only current ore was treated, the extraction being 81·33 per cent. 2. Ore reserve position.—The position of the estimated ore in sight at the end of the financial year is as follows:—Northern and East End Old Workings, 13,714 tons, assaying 4·0 per cent. metallic tin; South End and Intermediate Workings, 1,000 tons, assaying 4·5 per cent. metallic tin; ore as grass, 3,516 tons, assaying 6·3 per cent. metallic tin; total and average, 18,230 tons, assaying 4·47 per cent. metallic tin. The tonnage of accumulated middlings and slimes at the old plant available for retreatmest is approximately 8,000 tons, of a value of 2·5 per cent. metallic tin. The manager states in his report that all these tonnages are based on very conservative estimates. I agree with him. Sources of ore mined for year under review: Mined from reserves, 10,611 tons, or 37·26 per cent.; mined from lodes in excess of reserves, from supplementary fillings, and from development faces, 14,225 tons, or 49·96 per cent.; taken from prospecting dumps, 3,638 tons, or 12·78 per cent.; total, 28,474 tons, or 100·00 per cent. It would be interesting to compare the above with sources of ore mined for period six years and three months ended 30th June, 1915: Ex reserves, 32,064 tons, or 21·75 per cent.; ex supplementary fillings and lodes in excess of reserves and from development faces, 89,023 tons, or 60·41 per cent.; ex prospecting dumps, 26,281 tons, or 17·84 per cent.; total, 147,368 tons, or 100·00 per cent. Summary of ore reserves: Blocked out ore reserves, 14,714 tons, assaying 4·0 per cent. metallic tin; ore at grass, 3,516 tons, assaying 6·3 per cent. metallic tin; accumulated middlings and slimes, 7,975 tons, assaying 2·5 per cent. metallic tin; total and average, 26,205 tons, assaying 3·9 per cent. 3. Percentage of extraction of metallic tin.—The extraction during the year, based on the assumption that the value of the final tailing plus recovery give the correct value of the battery pulp, was 78·27 per cent. metallic tin. This is computed in the same manner as was done during the previous year, and shows a slight falling off of 0·54 per cent. as compared with that year. The tailing leaving the mill after treatment varies from 0.45 to 0.87 per cent. metallic tin. The technical advisers spared no effort during the past year in devising means of improving upon the present extraction methods. The final tailing has an average value of about 0·57 per cent. metallic tin, and of this at least 40 per cent. is a —200 product and contains metallic tin of the value of from 1·0 to 1·4 per cent. Thus it will be seen that the greater part of the tin contents of the final tailing are contained in about 40 per cent. of the ore after present treatment, all of which product will pass through the 200 mesh screen. Current product of this nature has been experimented upon by means of a Deister table, and research shows that about 50 per cent. of this value can be extracted as a commercial product, and it has now been decided to erect a sufficient number of Deister tables to treat the current product of this nature which comes daily from the mill. There are, however, large stocks of accumulated product of this fineness which have been stored for future treatment and which have approximately the same value. Experiments with this material have not been so successful as on the current material. Apparently after this material has been stored for a period the colloidal matter becomes so intimately associated with the crystalline matter that ordinary gravitation methods do not appear to be successful, and recent experiments have been undertaken with a centrifugal separator which imparts a force equal to five or six hundred times that of gravity, and this method appears to separate the crystalline particles from the colloidal matter, and work in this connection shows great promise. Experiments are being carried on with the object of installing a plant to treat, in addition to the current —200 material, another 40 tons per day from stocks. In this way it is hoped to replace the tin which is now being obtained from the tonnage of accumulated middlings and slimes when that will have been finished. in approximately another 10 or 12 months. 4. General position and prospects of the company. It is regrettable that owing to circumstances over which the management had no control the work of development underground, and to some extent, of exploration on surface, was of necessity curtailed. Practically no underground development of importance was accomplished for a period of nearly eight months, and for this reason the admitted ore reserves were encroached upon and other sacrifices with regard to the management of the mine had to be made. It is, however, very pleasing to be able to report that since it has become possible to recommence operations upon a commensurate scale great success has attended the efforts of the management in opening up ore of excellent value. The policy which you have laid down of vigorous effort in this direction has given excellent results, and in spite of the disabilities under which the mine has had to work during the year under review, operations have been profitable and will continue to be so, provided that the price of tin will not fall below that at which the operations may cease to be profitable. I have no hesitation in saying that the venture is in a sound position.

Zaaiplaats Tin.

The results of the Zaaiplaats Company for the month of August, 1915, are as follows:—Days run, 31 days; ore milled, 2,189 short tons; residues re-treated, 1,331 short tons; concentrates won, 70 long tons; average value of concentrates, 69·1 per cent. metallic tin; estimated profit for the month, excluding Government tax on profits, £2,311 3s. 8d.; adjustments in respect of estimated values of previous shipments, nil; profit declared for the month, £2,311 3s. 8d.; capital expenditure, £18 16s. 2d. Note.—The revenue for the month has been calculated on the basis of tin at £152 10s. per ton.

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RECENT INVESTIGATIONS ON DUST IN MINE AIR AND THE CAUSATION OF MINERS' PHTHISIS.—II.

[By James Moir, M.A., D.Sc., F.R.S.S.Afr.]*

The following is the second portion of Dr. Moir's paper, of which the beginning appeared in our last issue:—

This process depends on causing the larger particles to settle by allowing the suspension of the dust in sugar solution to stand for a definite time, calculated from the vicosity of the sugar-solution and confirmed by microscopic observation of the sediment. The "very fine" particles—viz., those of 12 microns and less diameter, remain floating and are then filtered off for gravimetric determination in the usual way. The sugar used to catch the dust is a mixture of 90 per cent. very coarse and 10 per cent. fine: this does not clog in a moist atmosphere. The quantity of water taken to dissolve the sugar is chosen so as to give a 16 per cent. solution by weight, *e.g.*, 40 gm. of sugar are made up to 220 cc. with warm water.

It is next filtered through a 260-mesh screen to remove very large particles over 50 microns in diameter, and the temperature adjusted to about 40° C.: under these circumstances the friction is twice that of water, and after stirring the solution is allowed to stand for 4 minutes per cm. height of liquid in the vessel, when all the "large" particles (and some of the fine ones) will have settled, and the upper liquid is removed by means of a siphon previously filled and fitted with a clip. Thereon the sediment is mixed with water up to the original bulk and allowed to stand for 2 minutes per cm. depth, *i.e.*, half the original time, which floats nearly all the remaining "fine" particles, and the siphon is again used. The second sediment consists almost entirely of particles larger than 12 microns and can be filtered off, ignited and weighed as usual: whilst the two siphoned-off liquors are united and also filtered off to give the weight of "very fine" dust. If a portion has been removed at the beginning for the purpose of counting the particles on the hemocytometer, an appropriate correction of the gravimetric results must be made. Thus if 5 cc. have been removed from 220, the correction is 5 in 215 or 1 in 43.

By counting the number of particles in the sugar solution from a known volume of mine air made up to a known volume of the sugar solution (the hemocytometer is used, which enables the number of particles in $\frac{1}{10}$ cubic mm. of fluid to be counted) we can calculate the number of quartz particles in the original air: this number varies from 10 per cc. in dusty street air to 90,000 per cc. in mine air after blasting.

If we count the "very fine" particles and also determine their weight in mg. by the above process, we get by division the number in a mgm., whence we can calculate their average diameter, using the formula $D=\sqrt[3]{\frac{1200\dagger}{N}}$ where N is the number of millions of the particles in a mg. and D is got in microns. For example, in air from dry-drilling, the particles are very small, and about 100,000,000 are required to weigh 1 mg.: hence $D=\sqrt[3]{12}=2.3$ microns, which is rather less than one-third of the diameter of a hemocyte (red blood-corpuscle).

The classification into large and small may be carried much farther with the hemocytometer. Thus in one case—drilling under standard watering conditions—I found that 99·10 per cent. of the number of particles were under 6 microns, whilst 0·72 per cent. lay between 6 and 12 microns, 0·16 per cent. by number lay between 12 and 25 microns, and only 0·02 per cent. were over 25 microns: the first class amounted to 300 per cc. of air sampled. Going by weight, however, the results were quite different, the percentages of the four classes being 64, 16, 11 and 9 respectively: the calculated number of particles per mgm. weight was respectively 87,000,000, 2,500,000, 900,000, and 120,000, showing that, though very few in number, the large particles appreciably affect the weight of the whole. Corrections were found necessary for dust contained in the sugar used. This was found to contain about 10 million particles of silica in the 40 grams used, which, with the filter-ash, weighed exactly 1 mg. on the average. Having now described the new experimental methods, I may pass on to some of the practical results. The first and most important of these is an investigation into the question whether the methods in use of "laying" the dust are capable of laying the very fine particles as well as the coarser ones. The result was satisfactory, and showed that *when the laying devices were in order and conscientiously used*, there was no predominance of "very fine" dust in the air which had undergone treatment; the percentage of "very fine" dust, going both by weight and by number, in such air was no higher than in the original untreated air. Thus, in drilling when the point of the drill is wetted by having a jet of water directed into a "down" hole, the amount of dust getting into the air is only 2 per cent. or 3 per cent. of what happens during dry-drilling, and this is the case whether one goes by weight or by number of particles per cc. of air. In fact, it is surprising to find how little variation there is in the percentage by weight of "very fine" (under 12 microns) particles: they constitute about two-thirds of the total weight of dust in all sorts of mine samples from different sources, and it is only in certain samples taken above ground, *e.g.*, during dust-storms, that a deviation from this rule can be found, the proportion of "very fine" dust then being insignificant, which is the main reason why street dust does not cause miners' phthisis, despite its appalling quantity in this country, for, unless the electrical factor is present as in dust-storms, not very much dust is raised (speaking gravimetrically) even by a very high wind. It should be noted that the practice of playing a jet of water at random over the working-face is not satisfactory. In such a case the smaller sizes of dust are not laid, and their proportion by number in the air becomes twice or thrice what would be expected from their weight, so that even a low gravimetric figure for the dust in such air (*e.g.*, 5 mg./cub. metre) is no guarantee of safety. A similar criticism, of course, applies to coarse sprays of water, and to certain miniature water-blasts used after blasting the "cut," which are quite incapable of catching dust particles to the number of, say, 50,000 per cc. of air, of which 99·9 per cent. are of the very minutest size. The thing to remember is that there is practically no class of underground air in which the dust is coarse in character; practically all show that over 97 per cent. of the number of particles observable are of the "very fine" (and dangerous) class.

(To be continued.)

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*In the Journal of the Chemical, Metallurgical and Mining Society

†This factor is a minimum value and may possibly require to be doubled in practice.

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THE AUGUST OUTPUT: GROUP RETURNS.

Rand Mines Group.

The following are the results of crushing operations of subsidiary companies for the month of August:—

Company	No. of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton.	Total Fine Ozs	Total Estimated Profit.
Rose Deep	300	7	69,700	16/ 5·6	20,493	£28,402
Geldenhuis Deep	300	7	54,200	21/10·2	16,918	11,576
Nourse Mines ..	260	7	58,100	19/ 9·7	16,480	11,437
Ferreira Deep .	280	7	56,850	18/ 6·2	22,784	42,482
Crown Mines ...	660	26	207,000	16/ 4·1	63,603	97,118
Durban Rd. Dp.	100	3	27,520	22/ 5·9	8,879	6,212
Totals & averages	1900	57	473,370	18/ 0·4	149,157	£197,227

The following are the results of crushing operations of Central Mining Companies for the month of August:—

Company.	No of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton.	Total Fine Ozs.	Total Estimated Profit.
Modder B.	*96	5	43,500	15/2·6	22,931	£62,889
New Modder ...	180	7	52,500	17/1·6	24,184	56,234
City Deep	†154	9	62,400	19/1·2	29,099	62,227
Village Deep ...	180	7	53,200	19/4·2	18,648	26,598
Village Main R.	160	4	32,500	17/6·2	13,083	26,009
Robinson	250	6	55,500	14/1·8	19,332	41,610
Bantjes Cons. .	100	3	21,300	19/4·1	5,568	2,701
Totals & averages	1120	41	320,900	17/3·5	132,845	£278,268

* Includes 16 Nissen stamps.

† Includes 4 Nissen stamps.

Modder B., Ltd.—The working costs for the month were appreciably lower, but the yield was undoubtedly higher than that called for by the ore reserves.

Consolidated Gold Fields Group.

The following are the particulars in regard to the outputs and profits for the month of August, 1915, of the undermentioned companies of the Consolidated Gold Fields group:—

Company.	No. of Stamps.	Tube Mills.	Tons Crushed.	Gold declared. Fine Ozs.	Total Profit.
Simmer and Jack ...	320	7	70,200	18,060	£30,132
Robinson Deep	160	10	53,000	18,117	26,001
Knights Deep	400	11	108,400	18,426	12,787
Simmer Deep	180	9	59,700	12,092	4,343
Sub-Nigel	30	2	6,930	3,175	2,501
Totals	1,090	39	298,230	69,870	£75,764

The sundry revenue included in the above total declared profit is as under:—Simmer and Jack, £1,800; Robinson Deep, £453; Knights Deep, £52; Simmer Deep, £628; Sub-Nigel, £306; total, £3,239.

Neumann Group.

The following are particulars of the results achieved by the crushing companies of this group during last month, and officially supplied, viz.:—

	TONS.	YIELD.	PROFIT.
Witwatersrand Deep	42,700	£51,855	£16,068
Wolhuter	35,900	43,355	14,021
Consolidated Main Reef .	28,180	39,532	12,018
Main Reef West	25,290	27,919	3,697
Knight Central	25,600	28,725	3,348
Total for group		£191,386	£49,152

Barnato Group.

The results of operations of the Barnato group for August are as follows:—

Mine.	Stamps.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte ..	100	54,000	£70,060
Ginsberg	75	15,785	17,693
Glencairn Main Reef	160	21,780	14,058
Government G.M. Areas .	100	48,000	65,407
New Primrose	140	23,400	19,548
New Rietfontein	50	4,687	5,056
New Unified	60	13,900	14,082
Quest	35	3,632	2,796
Van Ryn Deep	80	42,250	79,148
Witwatersrand	215	42,850	52,984
August totals	1,015	270,284	£340,832
July totals	1,020	269,143	£342,737

Mine.	Total Working Costs.	Working Costs per Ton Milled.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ..	£39,001	14·445	£31,531
Ginsberg	13,613	17·248	4,193
Glencairn Main Reef	12,068	11·082	2,135
Government G.M. Areas ..	47,893	19·955	17,880
New Primrose	13,506	11·543	6,165
New Rietfontein	4,221	18·010	930
New Unified	9,031	12·994	5,150
Quest	2,437	13·421	520
Van Ryn Deep	36,178	17·126	43,630
Witwatersrand	30,028	14·016	24,819
August totals	£207,976	15·389	£136,953
July totals	£211,261	15·698	£135,782

Monthly Gross Profits.—January, £126,738; February, £118,382; March, £128,225; April, £128,526; May. £131,577; June, £134,592; July, £135,782; August, £136,953.

Albu Group.

The following information is officially supplied regarding the August operations of the producing companies of this group:—

Company.	Stamps.	Tons Crushed.	Total Cost.
Aurora West	80	15,230	£13,878
Meyer and Charlton	75	15,000	13,503
New Goch	120	30,200	20,997
Roodepoort United	70	33,800	29,450
Van Ryn Estate	140	38,900	26,802
West Rand Consolidated ...	100	30,500	28,575
	585	163,630	£133,205

Company.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	18/ 2·7	£17,951	£4,073
Meyer and Charlton	18/ 0·0	33,992	20,489
New Goch	13/10·9	29,437	8,440
Roodepoort United	17/ 5·1	30,393	943
Van Ryn Estate	13/ 9·4	46,244	19,442
West Rand Consolidated ...	18/ 8·8	39,048	10,473
		£197,065	£63,860

Luipaardsvlei Estate.

During the month of August, 21,535 tons were crushed by this company, the profit for the month being £5,135.

THE WATER SUPPLY OF THE RAND.—VII.

[By W. INGHAM, Chief Engineer, Rand Water Board.]*

COST OF WATERWORKS.

The approximate average cost of water schemes *per million gallons per day* in England is given below for 292 towns:—

Number of Towns.	Average Population.	Consumption per Head per Day.	Quantity supplied in Galls. per Day.	Cost of Scheme per 1,000,000 Galls. per Day.
36	3,300	23·00	76,000	£117,000
59	6,500	25·68	167,000	119,000
36	12,300	26·62	327,000	84,000
17	16,300	23·70	386,000	122,000
30	24,000	26·56	637,000	99,000
25	34,000	30·80	1,047,000	113,000
12	43,000	25·00	1,075,000	123,000
9	55,000	22·00	1,210,000	149,000
7	64,000	23·14	1,481,000	165,000
7	73,000	26·40	1,927,000	120,000
3	83,000	39·08	3,244,000	105,000
6	93,500	26·00	2,431,000	84,000
24	151,000	31·64	4,778,000	119,000
12	260,000	30·90	11,124,000	132,000
9	960,000	35·64	32,214,000	109,000
292		Average 27·74		Average £117,333

The capital cost in the case of 292 towns in England as shown above, with populations varying from 3,300 to 960,000, and having an average consumption of 27·74 gallons of water per head per day, is £117,333 per 1,000,000 gallons per day. The average revenue obtained in the above towns is about 5s. per head per annum. The average prime cost of water in 48 large English towns is 6·08 pence per 1,000 gallons. The average cost of schemes and the average cost per head of population in England is shown in the following table:

No. of Towns.		Population.	Average Population in Towns.	Cost per Scheme.	Cost per Head of Population Supplied.
Pumping Schemes.	Gravitation Schemes.				
13		Under 5,000	3,332	£9.825	£3 0 0
	26	Under 5,000	3,329	7,951	2 9 3
10		5,000 to 10,000	6,267	19,353	3 1 9
	21	5,000 to 10,000	6,850	20,541	2 19 9
12		10,000 to 15,000	12,331	25,506	2 1 4
	19	10,000 to 15,000	12.286	29,455	2 7 11
12		15,000 to 20,000	16,352	57,343	3 10 2
	8	15,000 to 20,000	16.213	36,840	2 5 5
11		20,000 to 30,000	23.810	62,122	2 12 2
	15	20,000 to 30,000	24,079	63,156	2 12 5
11		30,000 to 40,000	34.136	108,364	3 3 6
	11	30,000 to 40,000	33,773	103,755	3 1 5
4		40,000 to 50,000	41.625	124,754	3 0 0
	5	40,000 to 50,000	44,420	139,719	3 3 0
2		50,000 to 60,000	54.890	100.490	1 17 0
	5	50,000 to 60,000	55.790	259,843	4 13 0
2		60,000 to 70,000	65,811	289,124	4 8 0
	7	60,000 to 70,000	63.850	199.600	3 2 6
4		70.000 to 80,000	74.500	204,243	2 14 9
	1	70,000 to 80,000	71.000	257,388	3 13 4
	3	80,000 to 90,000	83.000	339,060	4 1 8
3		90,000 to 100,000	92,666	165,921	1 15 9
	3	90,000 to 100,000	94.333	241,551	2 11 2
7		100,000 to 250,000	151,862	347,799	2 5 9
	16	100,000 to 250,000	150,921	792,026	5 4 11
6		250,000 to 500,000	336,389	1,025,829	3 0 11
	9	250,000 to 500,000	384.369	1,911,118	4 19 5
7		Over 500,000	862,887	2.545,369	2 18 11
	2	Over 500,000	1,066,000	4,930,101	4 12 6
104	151				

It will be observed from the above table that it is usually cheaper to obtain water for small towns from a catchment area in England, whereas the reverse is the case in obtaining supplies for large towns. The high cost of gravitation schemes in the case of supplies for large towns is principally due to the great distance of such towns from a catchment area which is large enough to supply their requirements. For instance, Manchester is situated at a distance of eighty miles from Lake Therlmere in Westmoreland, Liverpool 60 miles from Lake Wyrnwy in Mid-Wales, Birmingham 75 miles from Rhayader in Mid-Wales. Edinburgh 38 miles from the Talla Reservoir, and Glasgow 30 miles from Loch Katrine.

COST PER MILLION GALLONS PER DAY PER HEAD OF POPULATION IN SPECIAL CASES.

The following table shows the approximate capital cost per million gallons per day, and the cost per head of population in several large towns in different parts of the world:

	Cost per Million Gallons per Day.	Cost per Head of Population.
London	£87,000	£3·1
Liverpool	183,000	5·1
Manchester	183,000	5·4
Glasgow	66,320	3·6
Dublin	60,000	2·2
Paris	108,800	5·3
Berlin	106,796	1·9*
Vienna	218,000	3·2
New York	65,200	7·0
Chicago	26,000	3·3
Philadelphia	30,500	5·7
Boston	73,500	7·0
Melbourne	130,120	7·9
Johannesburg	380,000	7·0†
Capetown	235,000	7·4†
Durban	95,000	6·8†
Port Elizabeth—		
Old scheme	420,000‡	5·5†
New Scheme	217,000	5·0
Pietermaritzburg	60,000	3·0
East London	153,000‖	1·6

* Varies from £1·9 to £7·9.
† Based on white and coloured population.
‡ 500,000 galls. only.
‖ 300,000 galls. only.

The capital cost of the Derwent Valley scheme for supplying the towns of Sheffield, Derby, Leicester, and Nottingham, in England, has been about £3,500,000 for a supply of 13½ million gallons per day, or a little under £260,000 per million gallons. Edinburgh scheme, from the head waters of the River Talla, cost £1,125,000 for 10 million gallons per day, or £112,500 per million gallons. The new scheme for Johannesburg is estimated to cost £1,250,000 for ten million gallons per day, or £125,000 per million gallons, but this includes a barrage for impounding 20 million gallons per day. The Coolgardie scheme in Western Australia cost £2,662,000 for 5½ million gallons per day, or £484,000 per million gallons.

(*To be continued.*)

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* From Presidential Address read before the S.A.I. of E.

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Rhodesian Section.

LATEST MINING NEWS.

Rhodesia Chamber of Mines' Report—Bell Reef Development—Rhodesia Copper Co. Gold Fields Rhodesian Development

THE report of the Executive Committee of the Rhodesia Chamber of Mines for the month of July, 1915, states, *inter alia*:—The following is a summary of the returns of native labourers employed on Southern Rhodesian mines during the months of May and June:—

	May.	June.
Local	13,071	14,043
Portuguese Territory	6,822	7,002
Northern Rhodesia	8,764	9,045
Nyasaland	8,746	8,934
Other sources	1,012	1,109
	38,415	40,133

The number employed in June shows an increase of 476 as compared with the same month of 1914. The Committee, in reply to the Government, have advocated the introduction of a measure of compulsory insurance of white employees engaged in hazardous occupations, in preference to a Workmen's Compensation Act on the lines of the Union Act of 1914, which is considered too cumbersome for the needs of this country at the present time. The Committee have represented to the Government the necessity for providing means by which mining locations, when no longer required as such, may be converted into machinery sites. The Committee have represented to the Government the inadvisability of altering the tariff for mine timber and fuel as has been advocated by a farmers' association. The tariff was agreed to many years ago as a compromise between the various interests, and no adequate reasons for any alteration have been adduced. Amongst other subjects which have engaged the attention of the Committee during the month are:—Gold Trade Ordinance, farmers and water supply, mining employees and the war, mine medical conference, etc.

* * * *

The operations of the Bell Reef for the year to March 31 show a net profit of £6,179, which it is proposed to carry forward. It has not been possible, owing to the difficulties encountered during the year, to reduce the company's loan indebtedness to the Gold Fields Rhodesian Development Co., Ltd., which, with accrued interest, amounted at March 31 last to £54,222. In addition the company was indebted at that date to its bankers in the sum of £1,500. Development work has been restricted during the year, operations being confined to the 7th, 8th, and 9th levels. Recent advices in regard to the 9th level have been of a more encouraging nature, the reef opened up in the east drive giving good values, which are stated to be still continuing. The ore reserves at March 31 were estimated at 53,070 tons, of an average assay value of 10·8 dwts. per ton, being a reduction, after allowing for 34,202 tons milled and 30,484 additional tons developed, of 3,718 tons and 1·6 dwts. in grade, as compared with March 31, 1914; 34,202 tons were treated, yielding 16,978·2 ozs. of gold, equal to 9·9 dwts. per ton milled. The gold had an estimated value of £71,424, and after allowing for working costs, amounting to £60,096, yielded a surplus of £11,328.

* * * *

After dealing with the results for the past year, Mr. Edmund Davis, at the meeting of Rhodesia Copper, went rather fully into the relations between the company and the Chartered Company. A difference of opinion exists as to the title under which the land which the Rhodesia Copper Company has should be held. The directions of the latter are of opinion that the Chartered Company is demanding too much, and they have offered in the course of negotiations something less than half the amount. The question is one which will affect other land companies in the country, and naturally is of great importance. It is a pity, however, that money should be expended in litigation when it is so badly needed for other and more important purposes.

* * * *

The report of the Gold Fields Rhodesian Development Company, Ltd., for the year ended 31st March states that the realised net profit on the year's operations, after deducting all outgoings, shows a balance to credit of £53,106, mainly derived from dividends received on investments and interest. Depreciation has been dealt with in the same manner as last year, and in arriving at the figures prices have been taken as at 27th July, 1914. At the moment it is impossible to determine the amount of depreciation that should be regarded as permanent, but when a clearer view of the outlook can be obtained and the results of the crushing companies have established more reliable evidence of intrinsic values than is the case at present, the matter will receive the careful consideration of the directors, and they will then be better enabled to make such recommendations to the shareholders as may appear to them to be necessary to place the company on a more satisfactory basis. At the date of the last report £277,000 had been borrowed from the Consolidated Gold Fields of South Africa, under the arrangements made with that company; additional borrowings during the past year have raised the amount of the above loan to £422,000. The amount is probably the maximum required to be borrowed under this arrangement; repayment of the debt has already commenced, and it is anticipated that during its current financial year the company will be able to effect a substantial reduction. Owing to the war, both in Africa and in Europe, there has been no incentive to fresh enterprise, and expansion has been checked in all directions; moreover, the temporary scarcity of skilled white labour has rendered work at the mines more than ordinarily difficult, and the rise in price of mining material, in freight and in insurance has affected working costs. The directors do not anticipate any marked improvement in the present adverse conditions so long as the war continues, but the revenue of the past year should not be regarded as normal or as governing future prospects, the company's prosperity depending as it does on the full estimated revenue from its shareholders in the crushing companies, in the mining properties still to be exploited, on the development of mining claims owned or to be acquired, from business in connection therewith, and from the increasing value of its land holding. The directors anticipate that by the close of the year the company's financial position will have been considerably strengthened by means of the steadily increasing mining revenue and of the gradual reduction of loans outstanding.

Transvaal G.M. Estates.

The following are particulars of the August output of the above company:—Central Mines: Tons crushed 11,200, yielding 6,072·242 ozs. fine gold. Elandsdrift Mine: Tons crushed 660, yielding 706·652 ozs. fine gold. Vaalhoek Mine: Tons crushed 1,390, yielding 429·902 ozs. fine gold. Estimated value of month's output, £30,155; estimated profit for the month, £15,099.

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1915.

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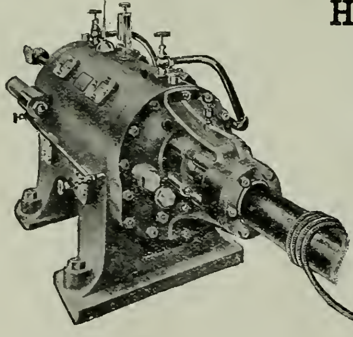

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Mine Safety, Sanitation, and Welfare Bulletin.

MISCELLANEOUS MINE ACCIDENTS.—I.

[By C. E. Hutton, Inspector of Mines, Germiston District.]

There are approximately 142,000 natives and 10,000 white men employed underground on these gold fields, of which number at least 70 per cent. go down the mines daily in cages or skips, the others walking down inclines shafts from the surface. During the year 1914, 61 separate accidents occurred under this head, causing 38 deaths and injuring 27 persons, in transporting this army of workers to and from their daily work. Many of the deaths occurred whilst natives were being transported through incline shafts having a dip of less than 45 degrees, the fatal accidents having been brought about by natives shifting their positions in the skip and thoughtlessly allowing their heads to come above the back of the skip and so into contact with the hanging wall, chutes or rollers. Fatal accidents of this nature have occurred to natives who, whilst the skip was in motion, lost their caps and in attempting to grab them have been killed, as the clearance between the skips and the roof of the shaft or some obstruction does not generally exceed a few inches. Skips used for the raising and lowering of persons in vertical or steeply inclined shafts have to be provided with a proper roof or cover according to Regulation 33 (10a). This regulation was framed with the idea of protecting the occupants from falling stones. If one could devise a cover for skips running on angles of less than 45 degrees so as to prevent natives from accidentally permitting their heads to stick up above the back of the skip, and at the same time this cover to be a permanent fixture and in no way impede its loading or tipping, the Mine Managers' Association would readily take it up. Fatal accidents have been brought about through cages having been rung away before all the natives were out. I enquired into an accident of this nature where the onsetter to a three-decker, thinking that all the natives had left the cage, gave the signal. The moment the cage moved off, a native stepped out of the bottom deck and was killed. The nigger had apparently dropped something on the floor and was delayed by searching for it. The onsetter should have satisfied himself that all persons were out of the cage before giving the signal; his native assistants on the upper platform must be made to understand that before shouting "Longela," they should make certain all the occupants have left their particular decks. To prevent any undue haste on the part of the hauling engine driver in responding to signals received, Regulation 30 (4) insists that he, after receiving the signal that persons are to be raised or lowered, shall not start his engine until the expiry of at least 10 seconds after receiving such signal. Again, to lessen the possibilities of accidents, Regulation 27 (2) demands that no engine driver shall act on any signal if he has been unable to do so within one minute after receiving it, but he shall await a fresh signal. As a further precaution the Mine Managers' Association have recommended that engine drivers, when lowering persons, shall immediately signal "3" to the cageman when he has brought his engine to rest and the brakes properly applied; on receipt of such signal the cageman will then, and only, open the doors of the cage to allow occupants to alight. This precaution is a wise one, as accidents have happened to natives whilst hurriedly getting out of the cage or skip the moment it arrives at a station, by not allowing time for the conveyance to come to a standstill, and often before the driver has applied and clamped the brake. This suggestion has been taken up, and is now a practice on some mines. For safe running it is of course essential that rail guides, and tracks generally, should be kept in a first class state of repair. The work of inspecting and repairing cannot be carried out in safety in compartments whilst skips or cages are running in adjoining compartments; this work in long shafts is usually done on Sundays, so that safety may be ensured and profits not unduly interfered with.

Machinery.

Under the head of machinery are included engines, workshops, tube mills, batteries and all machinery in connection with cyanide works, in fact all classes of driving or driven machinery. A very large number of the 114 accidents reported were only trivial, but at the same time there were 19 deaths recorded. These casualties were brought about by persons being caught in gearing or running belts, setting of tappets, the mechanical haulage mechanism, in fact in a hundred and one ways. The regulations re the fencing off the moving parts of machinery are well observed by the resident engineers. When one considers that a considerable amount of the oiling and all the cleaning of machinery is done by the aboriginal, I am of opinion that the accident rate under this head cannot in any way be considered unduly high.

Various, Surface.

The following list extracted from the records of the Mines Department, gives details of all the accidents classed as various (surface):—

	Separate	Persons	
	Accidents.	Killed.	Injured.
1. Trucks and tramways ...	73	7	66
2. Falling of material ...	40	6	36
3. Struck by cage or skip ...	3	1	2
4. Electricity	5	2	3
5. Boilers and steam pipes...	3	1	2
6. Burning and scalding ...	7	2	5
7. Falling and slipping ...	23	4	19
8. Splinters	8	—	8
9. Sundry	31	4	27
	193	27	168

One and all of the above are self explanatory, and need no remarks from me to make the causes more self-evident.

(To be continued.)

PERSONAL.

Professor Lawn, till recently consulting negineer to the Johannesburg Consolidated Investment Company, will in future act in an advisory capacity to that corporation in London. It is reported that the War Office has requisitioned his services for supervising a big munitions factory in Scotland.

* * * *

Many in South Africa will learn with regret of the death in Australia of Mr. W. Anderson, the well-known geologist, who was at one time Natal Government Geologist. Several of the late Mr. Anderson's papers have appeared in our own columns, and his contributions to the geological literature of this country are considered by his brother-geologists as of considerable permanent value.

WRIGHT'S ROPES.

Mashonaland Agency Meeting.

The annual general meeting of the Mashonaland Agency, Ltd., was held recently. Mr. H. L. Stokes presided, and in moving the adoption of the report, explained that the main business to consider would be proposals for winding up the present company with a view to reconstructing it and putting it on a dividend-paying basis Reconstruction had been considered advisable solely by reason of the depreciation in the market value of the company's various shareholdings and the delay in some of the mines in which the company's funds were invested in earning a distributable profit. The accounts showed very little change from those submitted last year, and the reason for this would be appreciated having regard to the unprecedented circumstances under which all business has had to be transacted during the past year. It was a satisfaction, however, to be able to submit a better profit and loss account for 1914 than had been the case for the previous years, and this was the reason why they proposed the reduction of capital, as they desired that out of the profits which the company was earning regularly a distribution should be made in the future rather than that they should be held in reserve to meet depreciation. The mining properties, claims, and rights had been brought into the balance-sheet at balance of cost—namely, £54,233, and included the Gothic and the Pagamesa, the Concession Hill Mines, and interests in the Elumba Mine. It was difficult to say the value of these mines, although the company were receiving a royalty from all of them. The latest reports received from the Concession Hill and Gothic properties were not of a very encouraging nature, and in the reconstruction the values at which these properties would be taken over by the new company would be very carefully considered; so that there was no possibility of any loss being sustained in respect of these by the new company. The farm lands, including Lochard Estate and stands and buildings, were brought into the accounts at £53,267, and represented the book value of the block of Agency buildings, the township stands, and the 449,551 acres of farm lands owned by the company. The Farms Manager estimated the value of the company's farm lands holdings alone to be approximately worth £111,000. The company's share investments were brought into the accounts at £258,911. These investments comprised the following substantial holdings: 1,910 Amalgamated Properties: 1.430 Antelope Gold: 29,979 Bwana M'Kubwa Copper; 2,000 Charterland and General Exploration; 17,616 Gold Fields Rhodesian Development; 4.607 Rhodesia Broken Hill Development; 6,467 Rhodesia Chrome Mines; 3,839 Scottish Mashonaland Gold; 146,300 Wankie Colliery; besides small holdings in various other companies. Taking a very conservative value of these holdings, they were worth in the aggregate about £138,270; so that there was a market depreciation of at least £120,641. Turning to the profit and loss account, the receipts had largely increased, the income for 1914 amounting to £23,296, as compared with £18,697 for 1913. They had taken to the credit of the profit and loss account £15,196, as compared with £10,016, the net profit earned during the year 1913; so that the income was gradually increasing year by year. Business during the past year of national stress had been much restricted, and it had not been possible to do much more in Rhodesia than to continue development in the various undertakings they were already committed to. They had considered it of the first importance to carefully husband their cash resources, accumulating such funds as had been possible, and the result was that the company now commanded a reasonable amount of cash, amounting to £50,423, available for general business. They were thus in a good position with which to meet the abnormal times that Europe, and, indeed, the world, was now faced with, and should be able to take advantage of such profitable opportunities as might offer. Under the able supervision of Mr. Steuart Richardson, and aided greatly by the very ample rainfall of the past rainy season, the Lochard Estate had come on excellently during the last twelve months, especially as regarded the great improvement of pastures, natural increase of cattle, and in the reduction of costs. Lochard, for its size, had developed into an ideal ranching estate, and it would soon be fully stocked: the herd at present numbered 2,000 head. In placing proposals before shareholders to reduce the face value of the shares from a £1 to a 10s. denomination, the assets were in no way affected nor reduced in value; the general position would, indeed, be greatly strengthened.

INVESTORS' DIARY.

FORTHCOMING COMPANY MEETINGS.

Sept 17.—Transvaal G.M. Estates
Sept. 24.—Sub Nigel; Simmer and Jack Proprietary.
Oct. 29.—Knights Deep.

AMUSEMENTS.

NEXT WEEK'S PROGRAMME.

His Majesty's—J C. Williamson's Co.	8.15
Empire—Varieties	8.15
Palladium	8.15
Carlton	7 to 11.15
Orpheum	7 to 11.15
Bijou	7 and 9

Goerz Group.

Results of operations of the producing mines of this group for the month of August, 1915:—

Company	Stamps.	Tons Crushed.	Total Revenue.	Revenue per ton.
Geduld Proprietary	60	26,200	£39,872	30/ 5
May Consolidated	100	14,500	11,031	15/ 3
Modder Deep Levels	60	34,000	62,212	36/ 7
Princess Estate	60	22,500	28,940	25/ 9
Totals	280	97,200	£142,055	—

Company.	Costs.		Profit.*	
	Total.	Per Ton.	Total.	Per Ton
Geduld Proprietary	£27,104	20/ 8	£12,768	9/ 9
May Consolidated	10,002	13/10	1,029	1/ 5
Modder Deep Levels ...	27,549	16/ 2	34,663	20/ 5
Princess Estate	28,324	25/ 2	616	0/ 7
Totals	£92,979	—	£49,076	—

Geduld Proprietary Mines, Ltd.—Reserve gold, 4,431 ozs.

*Including Sundry Revenue.

Robinson Group.

Results for August in the Robinson group were:—Langlaagte Estate: Tons milled, 53,480; total yield, 14,377 fine ozs.; estimated profit, £13,281; per ton milled, 4s. 11·60d. Randfontein Central: Tons milled, 204,739; total yield, 58,726 fine ozs.; estimated profit, £61,305; per ton milled, 5s. 11·86d.

Anglo-French Land Co.

The seventeenth ordinary general meeting of shareholders of the Anglo-French Land Company of the Transvaal, Limited, was held on the first day of September, 1915. Mr. Wm. Dalrymple presided, and there were also present: Messrs. S. C. Black, A. G. Gill, W. J. Gau, W. H. B. Frank, Edw. H. Read, F. E. Scriven, L. S. Raymond (secretary), and Geo. W. Austin (transfer secretary). The following shareholders were represented by proxy: Messrs. The Anglo-French Exploration Company, Ltd., J. L. Bergson and C. Pakeman, J. E. Grieveson, and the Estate of the late Sir George Farrar, Bart. The total representation was 23,401 shares out of an issued capital of £80,000. The chairman declared the meeting duly constituted, and the secretary thereupon read the notice convening the meeting. It was resolved to confirm the proceedings of the sixteenth ordinary general meeting of shareholders held on the 2nd September, 1914. The directors' report and audited statements of account for the year ended 31st May, 1915, as printed and laid on the table, were taken as read. The secretary read the report of the auditors. The chairman, in moving the adoption of the reports and statements of account, said: The directors' report and statements of account for the year ended 31st May, 1915, are before you for your adoption. The year's revenue amounted to £815, and working expenses to £639, there being a surplus of £176. An amount of £98 was spent in fencing the company's farms, and the available cash at the close of the year was £12,099. The demand for agricultural or grazing land in the districts in which your company's farms are situated has not been such as to give opportunity to the company to sell any of its holdings. As no doubt you are aware, the year has been a very disturbed one, more particularly in the country districts, culminating in the rebellion. This, together with the preceding three or four years' drought, has seriously interfered with agricultural development. The last rainy season showed a marked improvement, and it is to be hoped that we are now at the beginning of a cycle of years of more average rainfall, which will gradually permit of more enterprise from an agricultural standpoint, and thus give better opportunities for the disposal or leasing of land of the nature of your holdings. There is therefore no alternative for your company but to continue its waiting policy for the time being. No further farms have been let during the year. With regard to any prospecting for mineral development, I regret to say that no discoveries have been made in the vicinity of your property which would justify any money being spent on exploratory work. I now move the adoption of the report of the directors, together with the statements of account, for the year ended 31st May, 1915.—The motion was seconded by Mr. Gau, and carried unanimously. As there were no other nominations, the chairman declared the retiring directors, viz., Messrs. Wm. Dalrymple, S. C. Black, W. J. Gau, A. G. Gill, C. P. Marais, and Edw. H. Read, duly re-elected as directors of the company. On the motion of Mr. Gill, Mr. Black seconding, Messrs. F. W. Diamond & English and C. L. Andersson & Company were re-appointed auditors for the ensuing year, and their remuneration for the past audit was fixed at fifteen guineas each.

THE WEEK IN THE SHAREMARKET.

Better Tendency—Holidays Intervene—More London Demand.

The excellent returns from several Rand mines and the reassuring war news combined to stimulate the demand for gold shares in London, and the fact was reflected in the better tone of the local market at the beginning of the week. The advent of the Jewish holidays, however, made for quietness, and it remains to be seen whether the improving tone will be maintained on the resumption of business. All the Far East shares remain in growing favour, and there is a possibility of an early revival of activity on some dormant properties there. Zaaiplaats shares have recovered a little.

* * * *

	Thurs., 2nd.	Fri., 3rd.	Sat., 4th.	Mon., 6th.	Tues., 7th.	Wed. 8th.
Adair-Ushers	0 3*	—	0 3*	—	0 4*	—
African Farms...	7 6	—	7 3*	7 3	7 6†	7 3*
Apex Mines ...	14 6*	14 6*	14 9*	14 6*	15 0*	14 9*
Aurora Wests ...	7 6*	7 6*	7 6*	7 6*	9 0†	7 6*
Bantjes Cons.	5 9†	5 9†	—	—	—	—
Brakpan Mines...	58 6*	58 0*	59 3A	59 0*	—	58 6*
Breyten Collieries... ..	—	—	20 0*	20 0*	20 0*	20 0*
Brick and Potteries ..	5 0*	5 0*	5 0*	—	5 0*	5 0*
Cassel Coals	17 6	17 6*	—	18 0*	18 0*	18 0*
Cinderella Cons.	2 9*	2 9*	—	—	—	—
City and Suburbans. .	42 0*	42 6	42 0*	43 0	43 0	43 0
City Deeps	60 6*	60 6*	62 0*	61 6*	62 0*	61 9*
Cloverfield Mines ...	5 3*	5 4*	5 7	5 6	—	5 6†
Clydesdale Collieries	10 6*	10 6*	—	10 6*	—	14 0*
Cons. Langlaagtes	36 0*	36 0*	36 0*	36 6*	36 0*	36 0*
Cons. Main Reefs ...	17 9*	17 9	17 6*	17 6	17 9*	17 9*
Cons. Mines Selection ...	8 9*	—	9 0*	9 3	—	9 0*
Coronation Collieries	26 0*	—	27 6*	—	—	—
Coronation Syndicates... ...	—	—	—	2 6†	—	—
Crown Mines Debentures...	£98*	£98*	£98*	£99*	£98*	£98*
East Rand Centrals ...	2 9*	—	3 1	3 0	3 0*	—
East Rand Coals	1 8*	1 8*	2 0	1 10*	1 10*	1 10*
East Rand Deeps	1 3*	1 3*	—	1 3*	1 3*	1 3*
East Rand Props.	—	—	—	20 0*	22 0†	21 0†
East Rand Debentures ...	—	—	—	£83*	—	£85*
Eastern Gold Mines .	1 1*	1 1*	1 3	1 2*	1 2*	1 2*
Frank Smith Diamonds ...	1 6†	1 6†	1 6†	1 6†	1 0†	1 0†
Geduld Props.	30 6	30 6	31 3	30 9*	31 3	31 0
Gleneairns	2 0*	2 0*	2 0*	2 0*	—	2 0*
Goerz & Co.	—	—	—	10 6*	12 0†	—
Government Areas ...	22 9*	23 0	23 6	23 9	24 3	23 9
Jupiters	6 0†	6 0†	5 6*	6 0†	—	5 9†
Kaalfontein Diamonds	—	—	—	—	0 4†	0 4†
Klerksdorp Props.	1 6*	1 6*	1 7*	1 6*	—	—
Knight Centrals	6 11*	7 0*	7 3*	7 3*	7 6	7 5
Knights Deeps	—	—	—	—	25 0†	—
Lace Props....	4 0†	3 6*	3 7	3 9	3 6*	3 6*
Luipaardsvlei Estates...	—	5 6*	5 6*	6 9*	7 0	6 9*
Lydenburg Farms ...	3 2*	3 3*	3 3*	3 3*	3 4	3 5*
Main Reef Wests	6 6*	6 6*	6 7*	6 6*	6 6*	6 6*
Main Reef West Debs. .	£62½*	£62½*	—	£62½*	—	£62½*
May Consolidated	—	—	—	—	—	8 0*
Middelvei Estates	1 3*	1 0*	1 3*	1 6†	—	1 3*
Modderfontein B. ...	105 0*	110 0A	111 3A	110 0	110 6*	112 0A
Modder Deep Levels	98 0	99 0	99 5	99 0*	98 6*	98 0*
Natal Navigation Colls....	15 0†	—	—	—	—	—
New Boksburgs	1 0†	0 10*	0 10*	0 10*	0 10*	0 10*
New Eland Diamonds ...	10 0†	10 0†	10 0†	10 0†	—	10 0†
New Era Cons.	6 7*	7 0†	6 10	6 9*	6 9*	6 8*
New Geduld Deeps ...	2 3*	2 3*	2 4*	2 4*	2 3*	2 3*
New Heriots	—	—	—	—	52 6*	55 0*
New Kleinfonteins ..	21 9*	21 9*	22 1½	21 9*	22 3	22 6
New Modderfonteins ..	305 0B	—	—	310 0†	296 3*	297 6*
New Rietfonteins ...	1 0†	1 0†	—	1 0†	—	1 0†
Orange Diamonds.	—	—	—	0 4†	—	—
Pretoria Cements	—	—	—	—	—	41 6*
Princess Estates	2 6*	2 6*	2 6*	3 6†	3 6†	3 6†
Rand Collieries	2 0†	1 9*	1 9*	1 9*	1 9*	1 9*
Rand Klips	4 0*	4 3	4 5	4 5	4 3*	4 1*
Rand Nucleus .	1 4*	1 4*	1 6	1 5*	1 5*	1 4*
Randfontein Deeps	2 9*	—	2 9*	2 9*	2 9*	2 1*
Randfontein Estates	12 6*	12 6*	12 9*	13 0	13 0	13 0*
Robinson Deeps	—	—	22 0†	—	21 0†	—
Rooiberg Minerals .	—	16 3†	—	16 6†	16 0†	—
Roodepoort Uniteds	2 0*	2 0*	—	2 0*	2 0*	—
Ryan Nigels	2 6*	2 6*	2 6*	2 6*	2 6*	2 6*
Shebas	2 4†	1 9*	2 3†	2 3†	2 3†	2 3†
Simmer Deeps	1 6*	—	1 7*	1 7*	1 8	1 6*
S.A. Breweries	30 6*	30 6*	30 6*	30 6*	30 6*	30 6*
S.A. Lands ...	2 7*	2 7*	2 7*	2 7*	2 7*	2 7*
Springs Mines .	25 6*	26 0	26 6	26 0*	26 3	25 9*
Sub Nigels	9 6*	9 9*	9 9*	10 0*	10 0*	10 0*
Transvaal Coal Trust	37 6*	38 6	38 6*	38 3*	38 6*	38 0*
Transvaal Lands ...	—	10 0*	10 0*	—	—	—
Transvaal G.M. Estates	30 0*	30 6*	30 0*	30 0*	30 0*	30 0*
Van Ryn Deeps ...	49 6*	49 6*	49 6	49 6	49 9	48 6*
Village Deeps	35 0†	33 0*	—	35 0†	33 0*	—
Vogel Cons. Deeps ..	0 9†	—	—	0 9†	0 9†	0 3*
Welgedachts	—	—	13 0*	13 0*	13 0*	13 0*
Western Rand Estates ..	0 9*	0 9*	0 9*	0 9*	0 9*	—
Witwatersrands	52 6*	54 0	52 6*	54 0†	—	51 6*
Witwatersrand Deeps... ...	26 6	27 0*	28 0*	28 0	28 6†	27 6
Wolhuters	12 0*	12 0*	12 0*	11 9*	12 0	11 9*
Zaaiplaats Tins ..	13 3*	14 0*	14 3*	14 0*	15 0	14 6*

A Ex London. B Odd lots. * Buyers. †Sellers.

A Ex London. B Odd lots. * Buyers. †Sellers.

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CORRESPONDENCE AND DISCUSSION.

The Mines and Recruiting.

To the Editor, *South African Mining Journal.*

Sir,—On reading Mr. Gemmill's letter on behalf of the Chamber of Mines in your last issue, I addressed the enclosed letter, published in the *Star* of last Monday. I will be very glad if you can find space in your journal to publish a copy. As your paper is so widely read by mining men, some such measures as there outlined may be adopted. The Chamber of Mines have done as much or more than can be expected of them. They should now withdraw the offer and adopt this mild form of compulsion, as cajoling has failed.—Yours, etc.,

" OBSERVER."

The letter referred to by our correspondent is as follows: I have waited to see if the offer of excess pay and reinstatement on return made by the Chamber of Mines would have the desired effect on the recruiting of young men for the European contingent. When first it was made it was observed: " There is no excuse for them now; they will have to join." Up till now there is no sign of a rush. Great hulking young men, of right age and splendid physique, many of whom came out here to avoid the importunities of the Home public, and seem dead to all sense of shame, are now working for full pay, content that older men with their responsibilities should do the fighting for them. If the Chamber of Mines means business let it call for a return of such men, especially shortly before and at the time the munition workers went home. If they won't fight while those less fit for it do and cannot be shamed into their true position, surely some form of compulsion is justifiable. At the present time we need not expect action from our politicians, but the Chamber of Mines can move. Either of the following mild courses could be tried, and the end might justify the means: (1) Refuse employment to all of military age without dependents; (2) if services retained deduct at least 50 per cent., to be expended on behalf of dependents of those fighting for the shirkers. I hope the principles here outlined may lead to discussion in the Press, and even the shirkers' views be given.

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Mines Marking Time—Tendency of Values Easier—Galvanised Iron Steadied Up—Farmers Not Buying Through Deadlock in the Maize Trade.

In an interview with a group buyer, it was gathered that the mines are marking time as regards new purchasing—that is freely—and using from their accumulated stores. He remarked that this is not surprising, as evidence was leaking out from time to time, through the newspapers, and private advices, that the British Navy had secured the whip hand over the German submarines. This is the explanation for mining material and other goods arriving so regularly, so much so, that prices in Johannesburg are easing, with a very few exceptions. This is rather against the oversea advices, from which it appears that values at the factories are rather advancing, but there are agents here who must realise, as payments for railway charges from the coast are heavy and it is not everybody who can finance matters, at all times, comfortably. Hardly any comment is being made as regards the annual meeting of the Commercial Exchange referred to in these notes of last week. In fact, there was no outstanding feature to talk about, as the business procedure is running quite smoothly and things have settled down into the ordinary everyday grooves. Even the forthcoming election topics are almost ignored, as hardly anyone seems really enthused over anybody or anything. In consequence of several representatives having returned from the South-West Protectorate, some quiet talks have occurred over the chances for trade in that direction, but nothing definite to guide one's ideas can be gleaned up to the present. However, one thing is certain, and that is, no orders have been booked and small hopes are entertained for the immediate future, excepting perhaps some straggling orders from the Government railways. There are signs of a few prospecting parties going out for the baser metals, and rather high hopes were entertained of an alluvial tin proposition, but although a few miners are on the ground, yet so far no orders have come from that direction, as it is understood that so far the encouragement is not too good. However, it is always recognised that new propositions take time to cultivate to obtain decent results.

A commercial broker states that business in the mining lines has gone flat. The mines, similar to our Jewish friends, seem more inclined to have a holiday than to keep on buying. The enquiries from the engineering firms have also tapered off, and in fact he cannot explain why business has gone so dull of late. He thought the disquieting news from the eastern section of the war might have had a depressing influence, and although it is generally recognised that it will be a long war, yet when the enemy contemplates sitting down in Riga during the winter, it transforms conjecture into a certainty—for another year's spell of unrest.

Iron, Steel and Hardware Goods.

The special feature is the steadying of galvanised iron in the neighbourhood of 8d. per foot. It appears that although several large orders were " cut " at 7½d., yet the standard price kept at 7¾d. to 8d. per foot. The position is that since the several large consignments arrived almost simultaneously at the coast and were absorbed quicker than many people anticipated, the fright of a serious drop has quietly subsided. The local iron and steel production is still progressing, and some 70 to 80 men are employed at the Vereeniging works, where they have sufficient scrap iron to last for ordinary monthly outputs for several years. The Johannesburg machine shops have become more quiet, as regards order from the mines. This fact was mentioned to a buyer, who replied that the mines had workshops of their own, and fortunately no breakages of importance had occurred, and unless they had a big job their own mechanics did the work, which was found less expensive as the cost and inconvenience of conveying machinery to and from Johannesburg had to be added to the costs. This is not a bad explanation, although the one nearer the mark is that there is no new construction work and the mines are running under extra economical conditions, as may be some more money might be wanted by the Government when the South-West expedition bill has to be footed.

Chemicals.

There are very fair stocks of mining chemicals in town, and as a whole prices seem inclined to go easier, especially for large orders. The reason is, that mercury, a very important article with the mining industry, has fallen in London, and an idea prevails that minor things may follow suit. However, the side manufacturers of lead products have advanced prices oversea, and they are not coming forward so freely, therefore the tendency is one of firmness in values.

Electrical Supplies.

Up to the present the smaller contractors have been grumbling about the wholesale people unduly raising prices. This is not altogether a fair complaint because stocks in most lines got very short after the spoilage and damage done through the anti-German disturbances. There were exceptional cases, where a few firms had heavy stocks in certain lines and naturally raised prices to recompense themselves on other lines they were short of. However, on the whole, the trade, both wholesale and retail, went through a very anxious and trying time It now seems that goods are coming forward extra well from British factories that the general trend of prices is towards easiness, which is expected to become more pronounced in a month or six weeks, as mail and cable advices, as to the shipment of goods, are more encouraging than since the war started. Thanks to the British Navy, the British goods are coming in better than those from Holland or America, and it is expected when values are reduced that many jobs under suspension will be re-started and so give the long-suffering contractors a chance of some decent work again. Rubber flex is still scarce and the price is firm at the recent advance.

Leather Belting.

The price of 3 in. leather belting, of the standard size and quality, is now 1s. 8d. per foot as compared with 11d. in the pre-war days—a big rise. A letter has been received from London, stating that the Government is likely to restrict the export of leather goods, in any way suitable for the military requirements. In fact it would not be a surprise if, before long, all leather goods (other than boots) were made contraband of war. In the case of belting, substitutes can be found of cotton or other material to take the place of leather belting, but no doubt in the event of the mines requiring leather belting under special circumstances the Government would give the necessary permission, when asked for through the recognised authorities.

Oils and Paints.

There has been a slight advance in linseed oils and putty. Some very good assorted orders have been sent to the Belgian Congo, as well as throughout Rhodesia. We are always doing something with these parts, but usually in normal times, only in specialities and sorting up lines, but the orders referred to were complete in themselves and of good volume. Locally jobbing is quite good and the best painters well up in decorating and the more artistic work are in request, and might be termed scarce. For outside, and the

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rougher class of work, under the head of spring cleaning, the workmen are fairly plentiful. There is quite a dearth of soft soap, as the South African makers cannot obtain sufficient raw materials from oversea. A sample of soft soap was not recognised at first, owing to the partial absence of some of the customary ingredients. The price is 5d. per lb. wholesale.

Second-hand Materials.

Business is much quieter and the various yards are accumulating stocks in a small way. One of the principal reasons given for the dullness is that the farmers have almost ceased buying, and they are usually good customers, owing to the hanging up of anything like free dealings in mealies, in consequence of the difficulty in transhipping them overseas. Second-hand iron runs at about 6d. per foot, which is a shade dearer on the previous quotation. Timber is a shade easier at 1½d. per foot 3 ft. x 2 ft. by 1½ in. x 4½ in. There is a great scarcity of second-hand pipes of the smaller sizes, as well as tram rails.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in., 6d. per lb.; ½ in. up to 2 in., 37s. 6d.; 6 in., 35s.; over 6 in., 32s. 6d.; ⅝ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 30s.; over, 29s.; ⅞ in. and 1 in., 29s., all per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 40s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 35s. to 47s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d. and 5s. 6d., 30 in., 12s. 6d., 36 in., 15s. 6d., 42 in., 18s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6ft. to 10ft., 8d. to 8½d., 11ft. 8¼d.; 12ft. 8¾d.; 26 gauge, 6 ft. to 8ft. 6d., 9ft. 6¼d., 10ft. 6½d.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 30s. to 35s. per 100 lbs.; solder, 50 per cent., 1s. 3d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9¼d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4d. per sq. ft.; ditto, 4½ x 1⅛ and 6 x 1⅛, 5d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 3s. 9d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.

Bricks, cement, lime, etc.: Cement, imported, 32s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 20s. 6d. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 42s. 6d. 2/5 galls.; coal tar, imported, 8s. 6d. to 9s. 6d. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 22s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 11s. 11d. 2/5; petrol, 22s. 2/5; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £18 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 4s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 3d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; radiator lamps, 4s. 6d. each; double pure rubber flex, 6d. per yd.; 3/20 coils of wire, 25s.; do., 3/22, 20s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 10s. doz.; switches, 5 amp., 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. to 15s. 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

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Commerce and Industries.

Trade with South-West Africa.

Pending the issue of an official tariff book, the following information has been given of rates and fares to operate over the South-West Military Railways (owner's risk conditions):—(a) Mileages: Upington North Bank to Kalkfontein, 170; Kalkfontein to Seeheim, 112; Luderitz to Garub, 65; Luderitz to Kuibis, 126; Luderitz to Seeheim, 197; Luderitz to Keetmanshoop, 227; Luderitz to Gibeon, 333; Luderitz to Warib, 409; Luderitz to Windhuk, 542; Luderitz to Karibib, 661. (b) Rates and fares: Passengers, first class, 2d. per mile; second class, 1¼d. per mile; third class (coloured persons only), ¾d. per mile. Luggage, ½d. per 100 lbs. per mile; no free allowance. Goods, minimum, 5 tons, 5½d. per 2,000 lbs. per mile; smaller quantities, 7d. per ton per mile.

* * * *

English Companies with German Assets.

The position of English companies with German assets, and particularly of commercial concerns accustomed to draw supplies from enemy sources, has, of course, been very uncomfortable ever since the outbreak of the war, and the lapse of twelve months has not tended to improve their prospects. On the contrary, even where no damage has been sustained from German acts of violence, the process of depreciation has made itself felt in the lack of adequate supervision of valuable plant, this consideration applying, of course, with especial force to those concerns employing machinery in their operations. It is understood, however, that on the whole such assets as these have not been interfered with except when they have happened to be situated in the actual war area. Their control has passed to an official appointed by the authorities at Berlin to hold and deal with enemy property, and protection has thereby been secured against possible depredations by the German populace. The ultimate fate of such assets will, of course, depend to a very great extent upon the course of the war, while, if the European struggle were to end indecisively, it is probable that a general account would be taken of German property held in England, as against English interests held in Germany, and the totals set one against another for purposes of adjustment. This, of course, is only a vague outline of the situation, but it sufficiently indicates how this matter is regarded by parties interested therein. Just now the position of German mineral waters customarily in use in British Possessions prior to the war is exciting a good deal of attention in view of the virtual disappearance from the market of certain well-known brands of Teutonic origin. The springs will exist, of course, and are probably in as good condition as ever, and though the pumping and other machinery may have suffered from neglect, any damage caused thereby could be put right at a very small cost. As regards maintenance expenses, it may be assumed that there are sufficient funds in Germany to meet these, provided they have not been sequestrated, which is not considered likely. The position of such undertakings would, therefore, appear to be merely one of suspended animation, and a resumption of their activities should present no insuperable difficulty, either financial or physical, when the war is over.

Municipal Rates in the Union.

A report upon the Municipal finances of Durban, called for by a resolution moved by Councillor T. Burman. and carried by the Town Council, has been prepared by Mr. A. O. Jones, Town Treasurer, and contains some interesting revelations of the state of the borough finances. The report commences by dealing with the incidence of Municipal taxation of Durban in comparison with other towns, treating first of all with taxation on vacant land. In the table making comparisons with other towns, Durban comes seventh, with a 3 per cent. rate, and taxation per £100 of £1 5s., Capetown is highest, with 4½ per cent., and £1 17s. 6d., and Johannesburg the lowest, with 2½ per cent., and £1 0s. 10d. As regards the water supplied by meter per 1,000 gallons, Kimberley is the highest, with 6s. 8d., and Durban the lowest, with 1s. 10d. As regards electric light, the following are the comparative charges:—(1) Bloemfontein, 10d. to 2½d. per unit; (2) Maritzburg, 9½d. to 6d.; (3) Port Elizabeth, 9d.; (4) East London, 9d. to 3d.; (5) Capetown, 8d. to 7d.; (6) Kimberley, 6d.; (7) Pretoria, 6d. to 2d.; (8) Johannesburg, 6d. to ¾d.; (9) Durban, 5½d. to ⅝d. Tram fares, average charge per mile, based on cash fares:—(1) Pretoria, 2·35d.; (2) Bloemfontein, 2d.; (3) Maritzburg, 2d.; (4) Capetown, 1·6d.; (5) Port Elizabeth, 1·55d.; (6) East London, 1·43d.; (7) Johannesburg, 1.403d.; (8) Kimberley, .745d.; (9) Durban, ·67d. The following tables are also set out:—(a) Dwelling value £500 (land £200, building £300): (1) Kimberley, £20 12s. 6d. per annum for all municipal charges; (2) Johannesburg, £17 11s. 8d.; (3) Bloemfontein, £14 6s. 3d.; (4) Pretoria—Sewered area, £13, non-sewered area, £12 14s. 2d.; (5) Capetown, £11 7s. 6d.; (6) East London, £11 6s. 7d.; (7) Port Elizabeth, £10 6s. 2d.; (8) Maritzburg, £7 11s. 0½d.; (9) Durban, £6 5s. (b) Dwellings value £1,000 (land £400, buildings £600): (1) Kimberley, £29 1s. 8d.; (2) Bloemfontein, £23 5s. 6d.; (3) Johannesburg, £22 15s.; (4) Capetown, £20 15s.; (5) Pretoria—Sewered area, £20 5s. 4d.; non-sewered area £18 18s. 4d.; (6) East London, £18 12s. 5d.; (7) Port Elizabeth, £18 0s. 4d.; (8) Maritzburg, £15 2s. 1d.; (9) Durban, £12 10s. (c) Dwelling value £2,000 (land £600, building £1,400): (1) Kimberley, £58 3s. 4d.; (2) Bloemfontein, £42 10s.; (3) Johannesburg, £42 6s. 8d.; (4) Pretoria—Sewered area £37 5s., non-sewered area £35 6s. 8d.; (5) East London, £37 4s. 10d.; (6) Port Elizabeth, £36 0s. 8d.; (7) Capetown, £31 10s.; (8) Maritzburg, £30 4s. 2d.; (9) Durban, £25. (d) Business premises value £6,000 to £30,000: (1) Capetown, £114 10s. to £572 10s.; (2) Kimberley, £113 13s. 4d. to £567 16s. 8d.; (3) Bloemfontein, £103 17s. to £509 9s.; (4) Port Elizabeth, £95 2s. to £475 10s.; (5) East London, £91 10s. 9d. to £457 13s. 9d.; (6) Maritzburg, £90 12s. 6d. to £453 2s. 6d.; (7) Pretoria—Sewered area £81 to £400 10s., non-sewered area £70 15s. to £314 15s.; (8) Johannesburg, £78 to £377 2s. 6d.; (9) Durban, £75 to £375. The fact, says Mr. Jones, that the burgesses of Durban obtain far more than burgesses of other towns for the money they pay to their respective municipalities is a proposition that is far too obvious to admit of any discussion.

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Engineering Notes and News.

Cleaning Hollow Drill Steel.

With the advent of the Jackhamer and similar machines using hollow drill steel, a new trouble developed which has been the cause of considerable annoyance and added expense. The hole in the hollow steel often becomes plugged with particles of cuttings and dirt. As soon as a "steel" is clogged in this way it is useless until cleaned out, as the function of the hole in the steel is to permit passage of air to keep the bottom of the drill-hole clear; in water-drills, like the Leyner, to allow a thin stream of water to pass through by air pressure and wash out the cuttings. At times, however, as experience shows, the dirt will get into the steel and plug up. Perhaps the most frequent method heretofore employed, particularly when only a few drills are used, has been to heat the steel, after which it is an easy enough matter to remove the obstruction with a long thin wire, or by air pressure through a nozzle. As can readily be seen this method takes some time and labour. Also care must be taken when heating so as not to destroy the temper of the steel. Another method of abstracting the dirt, which is far more economical and rapid, is to use a light pneumatic drill. The plugged steel is first laid out before re-sharpening the bits, and a jet of air is applied through a nozzle. In many cases this air pressure is sufficient to clean the steel, but if the obstruction cannot be removed with the air-jet, the pneumatic drill is employed. With the $\frac{7}{8}$in. hexagon hollow Jackhamer steel, $\frac{1}{8}$in. wire is used; with steel having a larger diameter hole, such as the $1\frac{1}{8}$in. or $1\frac{1}{4}$in. steel used with the No. 18 Leyner-Ingersoll machines, a correspondingly heavier wire can be applied. If the drill-steel is plugged about 3 feet from the shank end, a $3\frac{1}{2}$ft. wire is long enough. If, however, the obstruction is, say, about 3 or 4 inches in from the shank end, a wire from 6 to 8 feet long is required, working from the bit end of the steel. Of course the time required to remove the dirt depends on its depth and hardness. It usually takes from one to five minutes. Compared with the method described above, this represents a large saving in time, according to Coly M. Olson The pneumatic drill employed for this service is manufactured by the Ingersoll-Rand Company, and is known as the No. 44 Little David non-reversible drill. It weighs only 10lb. It has a pistol-grip handle, is $15\frac{1}{2}$ inches overall, with a cylinder bore of $1\frac{1}{8}$ inches and a $\frac{3}{4}$ inch stroke. Air consumption is about 17 cu. ft. of free air per minute, at 90 lb. pressure. It is also equipped with a speed regulator by means of which any speed from 1,500 to 3,000 r.p.m. may be obtained. This drill can also be used for drilling up to $\frac{3}{8}$in. diameter holes in metal. It has a simple revolving motor, is well balanced and entirely free from vibration, so the operator has no trouble in handling it. It is admirably suited for the purpose above mentioned.

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The following representations have been addressed to the Railway Board by the Johannesburg Chamber of Commerce:—"I have the honour to inform you that the attention of my committee has been called to clause 34 of the Fourth Report of the Select Committee of the House of Assembly on Public Accounts, dated April, 1915, in which your Administration is criticised for the method in which comparisons were made between certain South African and oversea tenders respectively. My committee does not wish to enter into the details connected with the particular tenders which were then under discussion, but it desires to take the opportunity of emphasising the importance of the general principle that, in connection with your Administration's requirements, tenders from South African firms and from oversea respectively should be compared with due regard to the payments which in the ordinary course are due in respect of charges such as Customs duty, freight and railage. This Chamber, in times past, found it necessary to protest against the severe handicap under which South African firms were at one time placed owing to the above-mentioned principle not being recognised by Government departments, and it was considered to be a great hardship that business firms here, who are of great assistance to the Government as intermediaries in the collection of revenue—such as Customs and railway charges—should have been precluded from supplying Government requirements by reason of the fact that when importing direct the Government pays no Customs duty and charges itself a cheap railway rate. As you are no doubt aware, the principle stated in the second paragraph hereof is now embodied in No. 17 of the Union Government Tender Board Regulations, and my Chamber sincerely trusts that the Railway Board will authorise the General Manager to continue to deal with tenders on the basis of this regulation."

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CONTENTS.

PAGE

Notes and News 51

Topics of the Week:

Miners' Phthisis Compensation 53

Dr. Mellor's Rand Geology 53

"The Goldfields" Rhodesian Interests 54

Oil Prospects in Portuguese East Africa—II. 55

The Year with the Sub Nigel 56

Recent Investigations on Dust in Mine Air and the Causation of Miners' Phthisis—III. 57

South Africans as Mining Engineers 58

The Collapse and Recovery of the Bantjes Central Incline Shaft—II. 59

The August Gold Output in Detail 64

The Influence Moisture in the Air has on Mine Ventilation 65

Rhodesian Section:

Latest Mining News 66

Mine Safety, Sanitation, and Welfare Bulletin:

Miscellaneous Mine Accidents—II. 67

The Week in the Sharemarket 68

Personal 68

The Week in the Mining Material and Engineering Trades 69

The Week's Meetings: Swaziland Tin, Ltd. 70

Engineering Notes and News 71

Mining Conditions on the Rand—II. 71

Notes and News.

Machinery Accidents on the Rand.

We hope to print in full the paper by Mr. C. B. Patrick on Accidents due to Machinery on the Rand, read last Saturday night. The chief points in Mr. Patrick's experience as an Inspector of Machinery were summarised in his paper. The statement that for one year (1913) the compensation paid by the mines for machinery casualties was, roughly, £18,000, has attracted particular attention. This sum represents the cash distributed among the injured and the relatives of the killed. It is altogether apart from the hundred and one incidental expenses that are attached to even slight interruptions in the continuous running of plants, or the activities of staffs on and below the surface. The direct financial loss that is entailed by accidents is shown by the fact that the 1913 outlay in compensation is the equivalent of £1 18s. 9d. on every stamp at work. There seems to be no question that a large percentage of accidents is preventable, and the "Safety First" Committee is, fortunately, now tackling the matter in a businesslike way.

* * * * *

Anglo-French Exploration.

In accordance with the announcement made at the annual meeting of the Anglo-French Exploration Company, Ltd., in April last, the Board has now held meetings of the Preference and Ordinary shareholders on the 15th September, at which were passed proposals to cancel the Preference capital. This consists of 500,000 six per cent. cumulative shares of £1 each, and the scheme provides that in exchange for the preference shares £200,000 shall be given in cash and £300,000 in four and a-half per cent. debentures, redeemable at par at the rate of £15,000 per annum, with provision for earlier redemption by purchase or drawing if thought desirable by the board. Cash will be paid in respect of any holding involving a fraction of £10, the first year's redemption of debentures being reduced by the amount so paid in cash. Interest at the rate of 4½ per cent. per annum from 1st July to the date of the cancellation of the preference capital will be paid to the holders of the preference shares, the first payment of debenture interest being calculated from the date of such cancellation. In the course of a circular issued by the Board it is pointed out that hitherto, although a substantial profit may have been earned, no dividend could be legally paid on either ordinary or preference capital unless the assets showed a sufficient surplus in value over the capital and liabilities, and it is in order to remedy this condition that the Board is bringing forward the present proposals. The preference shareholder will have a portion of his capital repaid at par and will receive for the balance a security bearing a lower rate of interest, but will not be dependent upon a valuation of the assets, as his dividends have hitherto been.

* * * *

A New Coal Producer.

The latest addition to the producing collieries of the Transvaal is the Spitzkop Colliery, situated at Ermelo. This is an adit proposition, and consists of two seams 7 ft. and 6 ft. in thickness respectively. Operations are being concentrated on the 7 ft., or main, seam. The coal is bright and clean, and of high evaporative efficiency. Analyses give excellent results, showing the coal to be low in ash and high in fixed carbon and volatile matter. The area of the property is about 1,800 morgen, and it is estimated that the coal content of the two seams, after making allowances for pillars, etc., is some 20,000,000 tons. A recent visit to the property disclosed the fact that operations are proceeding briskly. About 4,000 tons per month, mainly from development faces, are being screened and trucked, and an additional screening plant, capable of dealing with 1,000 tons per day, is in course of erection, and will shortly be completed. The colliery is connected to the main line by means of a private branch line some five miles in length, and links up about midway between Ermelo and Breyten. The property is owned by a strong Capetown company, with Sir Frederick Smith as chairman, and the mine is in the capable hands of Mr. J. M. Martyn. The company is now only in its syndicate stage, and will, in all probability, be re-floated in the near future.

* * * *

Reduction of the Temperature in Mine Workings.

In the report of the Royal Commission on Mining Industry at Broken Hill (Sydney, W. A. Gullick), just published, a section is devoted to the question of the possibility of the reduction of temperature to 75 degs. Fahr., or if this should prove impracticable a reduction in the hours of work in proportion to the temperature of the mine. The Commission considered the question of what constitutes a high temperature. The standard of normality varies in Australia. In Queensland, a Royal Commission had previously recommended a degree of humidity represented by a dry bulb temperature of 85 degs. Fahr. and 80 degs. Fahr. wet bulb. If the dry bulb temperature exceeds 85 degs. Fahr., the wet bulb must be at least 7 degs. less. In Western Australia the standard is 87 degs. Fahr. dry and 80 degs. Fahr. wet. In Victoria 83 degs. Fahr. wet bulb, and in New Zealand 80 degs. Fahr. wet bulb. It will be recalled that in Great Britain the Royal Commission on Mines, 1909, refused to fix a standard, but Dr. Haldane has stated that for the economical working of a mine the wet-bulb temperature should not be allowed to rise above 81 degs. Fahr., unless perhaps where there is a good ventilation current. The present report discusses the various causes of high temperature in mines, which are due to:—(1) The progressive increase of temperature with depth; (2) the oxidation of minerals; (3) the warming influence of men, animals and lights; (4) explosives; (5) the incoming air during the summer months; (6) rise of temperature due to increased barometric pressure, amounting to 1 deg. Fahr. in 180 ft. It appears that in New South Wales there is a seasonal variation of underground temperature amounting to 3 degs. Fahr., but this would probably be overcome by improved ventilation. The hot places in a mine are always the dead ends, and it generally happens that the hottest places are those in which it is necessary to use water to keep down the dust, which keeps the air moist and raises the wet bulb temperature. The Commission has come to the conclusion that a standard should be fixed of 82 degs. Fahr., wet bulb, but a minority report recommends 78 degs. Fahr. wet bulb. In making this recommendation the Commission do not question the high authority of the British Royal Commission, but they maintain that it is a question of practical mining conditions in Australia rather than of pure physiology. The English Commission, they say, was considering rather the scientific limit to human exertion in high temperatures than the question of fixing a standard of comfort for underground workers.

* * * *

The Victoria Falls Power Company.

In view of the number of its chief officers on active service, no one can accuse the Victoria Falls Power Company of any lack of patriotism. The Marquess of Winchester, the Chairman, Mr. W. A. Wills, a director, and Major Bagot, the general manager, are all at the front, and the recent annual meeting held in London was presided over by Mr. A. E. Hadley, the managing director. He showed, in the course of his speech, that the year's operations resulted in an increased gross profit over the preceding year of £87,871. In 1913 there was carried to the appropriation account the sum of £467,823, and in respect of the year 1914 the sum of £555,694, the increase being, as above mentioned, £87,871. The interest charge on debentures has increased from £203,920 to £234,842. The directors have applied the sum of £150,083 towards depreciation and certain writings off, carrying forward to the credit of the profit and loss account in the balance sheet the sum of £161,248 1s. 2d., increasing that account to £266,446 16s. 11d. Out of this sum the directors have paid a dividend at the rate of 6 per cent. per annum for the six months ended June 30, 1913, and a further dividend at the same rate for the ten months ended April 30, 1914. These dividends were paid on January 6 and June 21, 1915, respectively, and accounted for £160,000, thus leaving a sum of £106,446 16s. 11d. remaining to the credit of the profit and loss account, as against £105,198 15s. 9d. at December 31, 1913. This increase, which enabled the company to distribute an additional £40,000, is satisfactory, since it shows the continued and growing prosperity of the undertaking. The monthly profits obtained so far during this year have again shown satisfactory increases, and it is hoped to pay off the arrears of preference dividend in two equal instalments with the next two dividend payments. The heavy capital expenditure necessitated by the recent large extensions to the plant of this company and the Rand Mines Power Supply Company has now practically terminated, but from next year onwards provision will have to be made for the redemption of the first debentures by annual instalments of £150,000. The sums arising from the provision made for depreciation have hitherto been required for extensions to the plants of both companies, but in future these annual provisions will be available for redemption of debentures. Regarding the outlook, Mr. Hadley said: "The times we are passing through make it a matter of extreme difficulty to forecast the future; but I may say that if the gold mining industry and our undertaking continue to work as at present—and every effort is being made in that direction—the Board does not anticipate any difficulty in meeting these charges. Since our last meeting the extensions to the air-compressing plant at Rosherville have been completed, and since the issue of our report—now in your hands—information has been received that the whole of the extensions of 33,500 h.p. of electrical plant at the Brakpan station is now in commission. With the plant installed we shall be able to meet any normal increase in the business, which I am glad to say still continues to develop steadily, without encroaching on the specified reserve plant."

* * * *

The Simmer and Jack Year.

In his report covering the operations on the Simmer and Jack property during the year ended 30th June, 1915, Mr. C. D. Leslie, the Superintending Engineer writes:—The fully developed ore reserve at the 30th June, 1915, amounted to 2,155,000 mine tons of an average mine grade of 5·2 dwts., and in addition there were some 273,000 tons of partially developed ore of an indicated value of 4·3 dwts. This estimate does not include reclamation tonnage, which is likely to contribute a large proportion of the ore to be drawn from this mine in the future, as this tonnage cannot be estimated or valued accurately from the disclosures in reclamation workings supplying the main information with regard to it. Satisfactory reef disclosures are being maintained, but it should be pointed out that the bottom levels of the mine are being opened out and that, by the end of the ensuing year, only a few main blocks of ore will require further development. Therefore it is to be expected that the ore reserve tonnage will decrease year by year. As compared with the previous year the tonnage milled was increased by 38,700 tons, the recovery value by 9·775d. per ton, and working costs by 10·057d. per ton milled, the total declared working profit (excluding revenue from accumulated slimes) being increased by £15,045 6s. 9d. On account of the number of men who went on military service, the withdrawal of mine workers who were enemy subjects, and the large influx of natives to the mines of the Witwatersrand, the standard quality of native labour was not maintained and mining costs suffered in consequence. An addition of 2,498 feet of development was charged to working expenditure, and there was a somewhat higher percentage of ore broken in stopes as compared with cheap reclamation ore which declined from 57 per cent. to 52 per cent. and will become less, so that a gradual rise in working costs may be expected. Although most of the reclamation ore for the year was of low grade, practically all of it was payable, on account of close attention to its selection, and this is one of the instances of the careful management which prevails on the mine.

TOPICS OF THE WEEK.

MINERS' PHTHISIS COMPENSATION.

Labour platforms and the correspondence columns of the *Rand Daily Mail* have been filled during the week with emotional appeals for a larger measure of compensation to the victims of miners' phthisis. Coupled with this request, the extent of which varies with the vicarious eleemosynary enthusiasm of the framer, is a demand that the present contribution of the miner to the Phthisis Insurance Fund be waived. The latter question was very fully threshed out at the time the original Phthisis Compensation Act was passed, and no new argument is now brought forward, either good or bad, to alter or affect the soundness of this particular section of the Act. The payment of a premium, though an insignificant one, cannot but have an effect not entirely negligible on the conduct of the insured, which, it is generally admitted, is an important factor in the case of phthisis. The bigger question of the amount of compensation has, of course, also been debated in and out of the House of Assembly at great length, and on many occasions. On the one hand, it is churlish to question the victim's right to adequate compensation, but, on the other, we must guard against the irresponsible talk of mere electioneering vote-snatchers, who advocate compensation on a scale beyond the wildest dreams of avarice, and, of course, utterly regardless of what the industry can bear. Let us look for a moment at the facts! During the twelve months ended 31st January, 1915, the total awards made by the Miners' Phthisis Board amounted to approximately £608,000, as compared with about £702,000 in the previous twelve months. The total amount contributed by the mines to the Board since the Act came into force (1st August, 1912) to the 31st January, 1915, was £1,256,000. All awards since 1st August, 1914, are made under the Insurance Fund, but as those previously made under the Compensation Fund were largely of the nature of annuities, payments from and assessments under this latter fund will continue for some years. The assessment of compensation under both funds, expressed in terms of per-ton-milled, now amounts to an average of 5·58d. Of the total claims made during the year 1914 the proportion for partial incapacitation only was considerably higher than in the previous twelve months. Of course, the amount payable for compensation for partial incapacitation has been increased since 1st August, 1914, from £98 to £200, and the increase may have caused a number of men to claim compensation, when partially incapacitated, who would not have done so while it remained at the smaller figure. It may be remembered that, as regards the Insurance Fund, it is provided by the Act of 1912 that for two years immediately following upon the commencement of the Act an amount equal to 5 per cent. of the earnings of miners is to be paid into the Fund. These contributions at the 1st August, 1914, amounted to approximately £370,000, and of that amount one-half was contributed by miners. On and after the 1st August, 1914, it was provided that an amount equal to 7½ per cent. of the men's earnings had to be paid into the Fund. Of that amount one-third has to be contributed by the miners themselves. This contribution of 7½ per cent. of the miners' earnings will produce somewhat less than £300,000 per annum, in addition to which the fund will have a small income from interest and fines. The position is, therefore, that at the 1st August, 1914, when awards under the Insurance Fund commenced to be made, the fund had £370,000 to its credit, and an estimated income of £300,000 per annum. With any increase in the awards the rate of contribution to the Insurance Fund will, therefore, have to be proportionately increased. The large proportion that even the present liability of 5·58d. per ton milled bears to the profits of many companies will be seen from the following table:—

Name of Company.	Working Profit per ton milled July, 1915.		
	s.	d.	
Bantjes Consolidated	1	3	
Durban Roodepoort Deep	4	2	
Glencairn Main Reef	1	11	
Knight Central	2	0	
Knights Deep	2	4	
Luipaardsvlei	2	1	
May Consolidated	1	5	
Princess Estate	0	2	Loss.
Roodepoort United	0	1	
Simmer Deep	1	5	

These companies, although returning so small a working profit to their shareholders, expend over £3,000,000 per annum in wages and stores alone, analysed as follows:—

Salaries and wages to white employees	£979,259
Wages to coloured employees	688,525
Coal	144,510
Explosives	191,055
Native foodstuffs	172,128
Other stores	837,184

By far the greater part of the above expenditure is actually retained in South Africa itself, and is distributed throughout the Union. The Government obtains a portion of it through railway rates, claim licences, and taxes. The white population of all classes benefits from it, the mine employees directly through wages, and the remainder of the population indirectly through expenditure by the mines and by the mine employees. The native population largely depends upon its earnings at the mines for subsistence, and for the means to pay its taxes. It is true, of course, as pointed out by the representatives of the mines, in giving evidence before the Select Committee last year, that as regards native wages, etc., owing to the almost continual deficiency in the supply of native labour, natives deprived of work through the shutting down of individual mines would usually be able to obtain work in the remaining mines. Still, nobody wants any more mines closed down—least of all the miners, whose spokesmen are now demanding the imposition of such further burdens on the industry as must entail that unwelcome effect. As an antidote to the glib promises and emotional appeals of election platforms, it is necessary that the foregoing few cold facts must not be forgotten.

Dr. MELLOR'S RAND GEOLOGY.

The papers upon the Upper Witwatersrand System and the East Rand which were lately contributed to the transactions of the Geological Society of South Africa by Dr. Mellor, with the permission of the Minister for Mines are now being published in interesting circumstances. While the structural problems of the West Rand, never of more than ephemeral importance, have long ceased to absorb the attention of the local syndicate promoter, those of the further East have hardly ever failed, during many years past, to be a prolific source of speculative activity and a flowing well of inspiration to the amateur geologist. At the present moment large expenditure is being incurred on the Far East Rand in the endeavour to prove a geological theory which, according to the view of Dr. Mellor, is hopelessly incorrect, and apart from the instance just cited there are a number of other interests, also, which are capable of being affected in one way or another by the evidence brought forward as a result of the recently completed survey. The subject matter of Dr. Mellor's papers has already been dealt with, broadly, in previous issues of this journal. It is impossible to discuss the full text of these papers in anything like detail within the limits of a single editorial, by reason of the vast amount of ground covered by them, and the many special aspects from which the various questions are regarded. From the point of view of economic interest the essential fact of Dr. Mellor's work is his conclusion that the Van Ryn reef of the Far East Rand and the Nigel Reef of the Heidelberg district are extensions of the Main Reef Leader of the Central Rand. The evidence in support of this opinion has been collected with the greatest care, and more abundantly than it could possibly have been gathered by any other observer. It is not selective in the sense that it is built up from data obtained in widely separated localities, but is cumulative, inasmuch as it represents the result of a connected and consistent traverse from one end of the Rand to the other. Such a weight of solidly constructed argument can only be overthrown by finding a flaw in its cohesion, and it is precisely in this quality that it appears to be most fortunate. Other questions of importance are the nomenclature of the several members of the Upper Witwatersrand System, and the emphasis which is put upon the character of certain groups of strata as markers in the vast succession from the base of the Main Reef zone to the top of the Kimberley Elsburg series. In the more outlying districts of the banket area, such as those of the Vaal River region these distinctions should be of great value. No less valuable should be the data regarding the thinning of the several series and their susceptibility to lateral variation from one point to another. The records of the numerous boreholes that have been put down in the Eastern Rand are shown by Dr. Mellor to be useful sources of information to prospectors and claim holders if considered relatively, while their liability to error when studied separately is shown by reference to particular instances. The conditions of deposition and the deltaic origin of the Witwatersrand System, as indicated so obviously in the character and arrangement of the strata which comprise it, are subjects of absorbing interest which are ably handled in the papers under review. They have a bearing upon economic problems which are becoming of more general interest day by day, and form the basis for the consideration of the Witwatersrand bankets from another point of view at a later date.

"THE GOLDFIELDS'" RHODESIAN INTERESTS.

The vicissitudes of mining in Rhodesia are well reflected in the annual reports of the Goldfields Rhodesian Development Company, Ltd., the great offshoot of the Consolidated Goldfields, which has taken over and administers the affairs of the properties in which the latter was interested in Charterland. Lord Harris presided at the annual meeting of the Goldfields Rhodesian Development Company in London in mail week, and in a lengthy speech reviewing Rhodesian mining conditions, conveyed a great deal of information relative to the position and progress of some of the more important properties. In dealing with the affairs of the controlling company he said:—" I should hope that the market value of the company's mining assets are at their lowest, though we must not forget that one of the company's principal investments—namely, debentures and shares in the Falcon mines—is to some extent assisted by the war prices of copper. The financial strength of the company should therefore in this next year considerably improve." Of course, the group has experienced some disappointments in the course of the year. There has been some considerable difficulty in treating the ore in both the Bell Reef mine, which held its annual meeting in mail week, when the subject was dealt with at great length by the chairman, and the Golden Kopje. "Though," said the Chairman, "I am confident that at the end of the next twelve months we shall be able to considerably reduce our indebtedness, and that our revenue will increase, still, I cannot, of course, dispute factors like these, which, to some extent, must qualify our confidence in mining in Rhodesia. Therefore it is that the directors feel that, having regard to the large capitalisation and the heavy indebtedness, it is quite out of our power to promise a distribution of profits at any early date." Lord Harris gave some interesting information regarding the subsidiary companies. The Shamva, the Eldorado, the Gaika, the Selukwe Columbia, and the Thistle Etna have all distributed dividends, and from the schedule issued it is possible to calculate what the values of the "G.R.D." interests in each of those investments are collectively and individually. The Antelope is paying off its debts, and will be able to distribute dividends presently. Very favourable developments on that mine in depth are reported. The 12th level is better than the 10th, so far as it has been proved above and below the level, over a distance of 100 ft., which may be regarded as very encouraging. In the Bell Reef great difficulty has been experienced in connection with the treatment of the ore. The ore is of a refractory character, and although great pains were taken in the early days to sample in bulk, in order to ascertain what was the best method of treatment, there has been disappointment. At the present moment it is proposed to spend a little more on the plant, and the metallurgical expert who is now on the property is very hopeful that he may meet with a good result. Again, at the Golden Kopje the same difficulty has cropped up as regards the plant and also as regards the stoping. The difficulty is that the hanging reef is of a sandy character, and as the ore is stoped the hanging reef runs into it and makes the result more difficult of treatment. Mr. Macdonald says that the outlook for the Golden Kopje is distinctly better as the result of the new stopes now opened up. He adds that the grade for last month is satisfactory, and it is hoped that as the peculiarities of the ore occurrences become better known, and when the sulphide zone is reached, the difficulties now experienced will disappear. The Falcon has had a very promising start, and is paying off its debt. The Shamva has realised expectations, both as regards tonnage and as regards the efficiency of the reduction plant. The working costs are satisfactory, and are actually 6d. a ton less than the estimate. It is, of course, too early at present to prognosticate what the 5th level is going to show; but an encouraging cable has been received in London showing payable ore at that level. Things have not gone so well with the Planet-Arcturus and Asp. The development of the Slate and Arcturus has been satisfactory. The Planet-Arcturus mine itself is on a different reef. It has been let on tribute, and it is hoped that the result will be satisfactory. On these mines and on Turkois development on the lowest levels reached have given very satisfactory results, and it is therefore the more unfortunate that financial considerations have prevented them from being brought to the producing stage. The resident directors claim that the companies in which the Goldfields Rhodesian is interested have been able to produce minerals to the value of over £1,000,000, notwithstanding the adverse factors, such as the abnormal rains last season and the war, which have hampered the industry. In closing his speech, Lord Harris referred at some length to the assistance that the Consolidated Gold Fields had been in regard to the matter of finance, and since the commencement of the war in securing for the Rhodesian mines all the advantages, both as regards their protection as gold producers and the ability to secure mining materials that were necessary. It appears that the Consolidated Gold Fields, at a very early stage in its negotiations with other South African companies and higher authorities, took care to stipulate for equal treatment for the mines in Rhodesia as for the mines in the Transvaal, with very happy results to all concerned. It will be seen that despite the disappointments inevitable from the solution of novel metallurgical problems, the mines of the group have, on the whole, come well through an unprecedented year.

Uses of Zinc.

Interest in the production and uses of zinc has been greatly stimulated of late. Mr. Reginald Le Neve Foster has presented the Royal Society of Arts with a donation of £140 for the purpose of founding a prize in commemoration of his father, Mr. Peter Le Neve Foster, who was secretary from 1853 to 1879. The Council have determined to offer the prize for a paper on "Zinc, its Production and Industrial Applications." The prize will consist of a sum of £10 and the silver medal. It is expected that some account will be given of the history of the metal, the sources of its supply, its metallurgy and the various uses to which it has been or may be applied.

OIL PROSPECTS IN PORTUGUESE EAST AFRICA.—II.

Tectonic Structure of the Coastal Beds—The Identity of "Nhangellite"—Operations in the Field.

By J. E. Mills-Davies.

Those who are interested in the study of the tectonic movements which have occurred at various periods in the geological history of South Africa will find much information upon the subject in the paper of Professor Schwarz, to which reference has already been made. The matter is dealt with at some length, also, in a paper contributed to *The Geographical Journal* of January last by Messrs. E. V. Thiele and R. C. Wilson, dealing with the tectonic and physiographic features of Portuguese East Africa between the Zambesi River and the Sabi River. From a consideration of all the evidence to hand it is clear that the Cretaceous beds and those lying above them in the geological scale have been subject to periodic movements of an extensive kind, some of which, according to Dr. Thiele, have been moderately recent. In proof of this he cites the case of the Sheringoma Plateau, where there has been a post-Miocene uplift of at least 1,000 feet. Vast alternating up and down movements such as those which have been in operation since the Cretaceous system was laid down cannot have occurred without producing faults and folds in great number in the strata of which it is composed. There is no direct evidence to this effect in the low-lying coastal belt of the Portuguese territory, for most of the surface is covered by a deep accumulation of sand and jungle growth, but there are indications of broad folds in the alternating ridges and valleys, and long lines of lakes which are a marked feature of some portions of the Cretaceous area. That comparatively slight variations in the average dip along a monoclinal slope are sufficient to provide suitable collecting places for accumulations of oil is abundantly demonstrated in the case of Ohio, West Virginia and Pennsylvania, where some of the largest oil and gas fields exist. In an instance quoted by F. G. Clapp in Vol. VI., No. 1 of *Economic Geology*, the rate of dip of some productive sands in Ohio ranges from 20 feet per mile to 200 feet per mile according to locality. Interruptions occur in the shape of small and sudden changes in the general continuity of dip, and to some extent these are emphasised by variations in the texture of the oil sands. From the point of view of structure, one finds no reason to suppose that the coastal region of Portuguese East Africa is in any way less favourably conditioned than other areas where a monoclinal dip prevails. In a conversation with the writer, Mr. Cunningham Craig expressed the opinion that a favourable locality for the finding of oil in this territory would be in those parts towards the extreme north-west where definite folding might be expected according to the statements of geologists, but he seemed to entertain the view that well-defined anticlines and synclines were essential to success, assuming that other conditions were fulfilled. As has been pointed out, this is not the common experience of the oil drillers in the United States.

Oil Producing Materials.

The Upper Cretaceous Series in Portuguese East Africa, as might be anticipated from the character of the sediments, contain an abundance of material, both of vegetable and animal kind, from the original constituents of which petroleum could have been distilled. One of the most important facts in connection with this question of the probable existence of petroleum in profitable quantities, is the fact that compounds allied to petroleum, and crude petroleum itself, have actually been found in the territory. Some confusion appears to have arisen with regard to the nature of bituminous products found upon the sand in the neighbourhood of Lake Nhangela, and a substance called "Nhangellite," which has been found in the same place has served to create a mistaken impression about the material evidence that exists there. Speaking of the earlier theory of the formation of petroleum from seaweeds, or fucoids, Mr. Cunningham Craig observes in his book on "Oil Finding," that "the theory was again revived by the discovery of 'Nhangellite' found in Portuguese South Africa, by the decomposition of fresh-water algæ in dried-up shallow lakes, and the claim that this Nhangellite was evidence of the existence of petroleum in the neighbourhood. In 1906 the author was asked to investigate this claim in the field, but the evidence seemed insufficient to justify the necessary expenditure of time." A personal examination of the materials scattered along the shores of Lake Nhangela has made it clear to the writer that dried algæ from the lake itself has been submitted for examination. It is to be found in abundance, associated with bituminous matter which is obviously of a different kind and has come from a different source. Analysis of the two products is sufficient to substantiate their complete difference of composition, and to prove the bituminous character of the one and the fucoidal nature of the other, and it is doubtless due to the fact that the distinction was not sufficiently obvious to the first prospectors in the field that Mr. Craig found the evidence unsatisfactory. Since that time a considerable amount of boring has been done, and according to the drilling record of the last and deepest borehole exceptionally good indications of petroleum were found at no great distance from the surface. From published reports it appears that a large quantity of oil bearing sand and shale and some gas were met with at several points down to a depth of between 800 and 900 feet. Operations were discontinued owing to the loss of the tools at the bottom of the borehole, where the casing had evidently not been driven quickly enough, and to the difficulty of obtaining further funds for the carrying on of the exploratory work. The site of the borehole itself does not seem to have been judiciously chosen, for it was located at the top of a ridge a few hundred feet above the level of the adjoining lake, the impression being, as far as can be gathered, that the ridge formed the upper limit of an anticline, and that, on the old anticlinal rule-of-thumb, it was hardly worth while boring lower down. There is no evidence of the existence of an anticline, and it is probable that a good deal of work was done unnecessarily. As far as the evidence goes, if the driller's log is to be relied upon, the indications of the existence of petroleum were quite as good as could reasonably be expected in a tentative undertaking of that kind. It is much to be regretted that circumstances did not permit of a continuation of the work. Whether the Lake Nhangela area is the best that could be selected for the purpose of investigating the oil-producing possibilities of the formation is open to doubt. The investigations of the writer lead him to believe that much better indications are to be found in other parts of the Portuguese territory. At the same time a careful sifting and examination of all the data provided by the operations at Lake Nhangela itself would be valuable and even necessary before expenditure was incurred in exploring other areas. It is interesting to note that an analysis of the distinctly bituminous material found in the neighbourhood showed results equivalent to 102·21 gallons of oil per ton of 2,000 lbs., and a coke residue equal to about 22 per cent. of the original product treated. The crude oil yielded as follows:—Naptha, 3·48 gallons; burning oil, 20·44 gallons; intermediate (840—50), 6·19 gallons; intermediate (865—70), 6·58 gallons; lubricating do., 18·89 gallons; hard scale, 4·25 gallons; soft scale, 2·12 gallons; total, 61·95 gallons.

THE YEAR WITH THE SUB NIGEL.

Net Profit, £11,792—Points from Directors' and Consulting Engineer's Reports.

The report of the directors of the Sub Nigel, Ltd., for the year ended 30th June, 1915, shows the area of the property, on which claim licences are paid, is equal to an area of 1,494·2860 claims, which is the same as last year. These claims are situated on the farms Varkensfontein No. 217, Droogebult No. 350 and Noycedale No. 71, all situated in the Heidelberg district. It is estimated by the superintending engineer that the claim area exhausted at 30th June, 1915, amounted to 41·53 claims, leaving 1,452·756 claims still intact, the greater proportion of which have not been exploited. The company also holds six water-rights (of which four are situated on the farm Bultfontein, one on farm Noycedale, and one on farm Varkensfontein), one machine stand, and a 17·39 per cent. interest in the following claims and water-rights taken over from the Central Nigel Deep, Ltd. (in liquidation):—(a) 15·987 claims on the farm Varkensfontein No. 217, and (b) two water-rights on the farms Varkensfontein and Bultfontein. In addition, the company holds the freehold of a part of the unproclaimed portion of the farm Bultfontein, in extent 608 morgen 283 square roods. The profit on working for the year, after making provision for the expenditure of £6,311 7s. 6d. on renewals and replacements of machinery, plant, etc., amounted to £8,394 4s. 3d.; add sundry revenue from interest, dividends, etc., £4,748 14s. 2d.; making a gross profit of £13,142 18s. 5d.; less contributions to miners' phthisis funds, amounts written off for depreciation, etc., provision for South African income tax and expenditure due to war, £1,350 6s. 2d.; leaving a net profit of £11,792 12s. 3d.; add balance at credit of appropriation account at 30th June, 1914, £1,426 0s. 7d.; total, £13,218 12s. 10d.; out of which there has been appropriated for dividend No. 5 of 2½ per cent. declared during the year, an amount of £10,789 10s.; leaving at credit of appropriation account at 30th June, 1915, an amount of £2,429 2s. 10d. The balance of working capital unexpended at 30th June, 1915, was £63,356 7s.; in addition to which the company had expended on livestock, vehicles and harness and furniture and instruments, £378 9s. 6d.; stores, £8,637 14s. 10d.; investments, £10,354 8s. 5d.; payments in advance, £2,859 4s. 7d.; making a total of £85,586 4s. 4d. The capital expenditure for the year amounted to £44,774 3s. 7d., but of this amount £28,070 2s. 5d. had not been allocated to the various capital accounts at 30th June, 1915. The amount of £14,109 0s. 7d. standing to the debit of exploratory development account at 30th June, 1914, together with an amount of £4,624 2s. 4d. expended during the past year on exploratory development, have been transferred to "development" account. The ore reserves of the company were therefore represented by the sum of £18,733 2s. 11d. as at 30th June, 1915. Owing to delay due to the war the new plant, designed to increase the crushing capacity of the mine up to 8,000 tons per month, was only brought into commission during the last month of the financial year, when an improved tonnage of 5,950 tons was crushed. A further increase was registered during the month of July, when 6,570 tons were crushed, and it is hoped that the increase will gradually continue until the maximum tonnage is attained. The superintending engineer, Mr. C. D. Leslie, writes:—The fully developed ore reserve is estimated at 194,000 mine tons, valued at 7·8 dwts., and the partially developed ore at some 26,000 mine tons, to which has been assigned, from available information, a value of 9·5 dwts. The development work accomplished during the year amounted to 6,243 feet, of which 3,550 feet were sampled, indicating a reef width of 13·00 inches and a reef value of 25·38 dwts., being a slight improvement in both width and value as compared with the footage sampled for the preceding year. As compared with the previous year, the tonnage milled was increased by 815 tons, the recovery value by 2s. 4·422d. per ton, and working costs (including expenditure on renewals of machinery and plant) by 6s. 1·773d. per ton milled. The declared working profit was reduced by £10,777 3s. 10d., or 3s. 9·351d. per ton milled. The higher working costs are due chiefly to an increase of 1s. 5·279d. per ton in mining, 1s. 9·560d. per ton in development (which was greater than last year by 686 feet), and 2s. 0·312d. per ton for plant renewal. They were also influenced adversely by dislocation of work while changing over to new plant and by the withdrawal of 36, or about 31 per cent., of the employees of the mine for active service. Through delay in the arrival of material on account of disturbances in Europe, the new plant was not fully completed until last month (July, 1915). The additions to the reduction works, which were carefully planned with a view to possible future extension, are giving complete satisfaction, although it has to be mentioned that the old wooden vats comprising the sand collector plant are not in a good state of preservation. The sinking of "C" incline shaft is being continued, and during the next 15 months it is expected that the workings of "B" and "D" sections will be connected up with this incline shaft in such a way as to give facilities for cheaper working. When this shaft reaches the horizon of the 15th level it is proposed to concentrate water there which will be pumped to the surface by a new electric plant. An increasing percentage of the ore being milled is coming from "E" shaft, where the reef widths and values are above the mine average. The areas opened up in "E" shaft are confined between dykes, which are interfering with progress in exploiting the large western area of your property. In April last Mr. C. F. Parry, acting on medical advice, resigned his position as manager of your mine, and it was a matter of great regret that he felt obliged to take this step. Mr. F. G. Dunning, who was appointed to fill the vacancy, is carrying out his duties in an able and energetic manner.

The "Tank" Report.

Owing to the war, the Tanganyika Concessions is still receiving no revenue from its copper interests. The head office of the chief subsidiary, the Union Minière du Haut Katanga, being in Brussels, it has obviously been impossible for it to have its balance sheet passed or for the directors to declare a dividend. Meantime, the Tanganyika's only revenue for 1914 was again some £2,000 from transfer fees and interest, so that there is another huge deficit—nearly £137,000, against £176,000 for 1913—to be written off premium on shares account. However, the expansion of the Union Minière's smelting operations is progressing satisfactorily. Over 10,700 tons of copper were produced last year, and it is expected that the foreshadowed production of 25,000 tons per annum will be duly achieved next year. It is claimed that "although freight and insurance have risen considerably in consequence of the war, the profits now being made are satisfactory, and at present prices exceed the figure that had been anticipated. The difficulties which have been caused by the war will be realised when it is remembered that the sanction of the High Court was recently obtained to a scheme for postponing the payment of debenture interest until, if necessary, six months after the conclusion of peace. The profit and loss account of the Associated Zambesia Exploring Company shows a credit balance this time of only £8,200, as against just over £27,000 for 1913. The revenue is mainly derived from interest. There is nominally nearly £260,000 to be carried forward, but actually this is locked up in the business, the cash in hand at the end of 1914 having been £1,100 only. Moreover, £185,000 odd is owed to bankers and others against security.

The best "Reef Traveller" is the *South African Mining Journal.*

RECENT INVESTIGATIONS ON DUST IN MINE AIR AND THE CAUSATION OF MINERS' PHTHISIS.—III.

[By James Moir, M.A , D.Sc., F.R.S.S.Afr.]*

The following is the conclusion of Dr. Moir's paper, of which the beginning appeared in a previous issue:—What the lungs have sometimes to contend with underground may be seen from the fact that during light work about 7,000 cc.‡ of air per minute are usually breathed in, and three times as much during hard work. It follows from this that it is difficult to find any place underground where the number of particles inhaled is less than a million per minute, whilst the case of those who go in for dry-drilling is much worse, since they may inhale 60 or 70 million per minute, or 3 or 4 million in every breath! As for the person who goes in immediately after blasting, which used to be quite common, he gets at least 10 million and sometimes 30 million particles per breath, and obviously no lungs can stand that. The air of a dust-storm may treat one to 10,000 particles per breath, and most of us think that is quite enough, and that our lungs are not constructed to get rid of much more than that. The air of crusher- and sample-houses comes out badly in the table, but I may remark that this kind of dust is distinctly coarser, and in addition is not breathed continuously by the employees; the underground man gets in addition an occasional dose of CO and of tubercle germs, and therefore suffers more from a given dose of dust than a surface man: all this explains the comparative immunity of crusher-house men from miners' phthisis. Some investigations were also made in continuation of my work on carbon monoxide in mine air due to the use of explosives. It is necessary to point out that I was the first

1	2	3	4	5	6	7	8	9
Nature of Sample.	Number of Silica Particles per c.c. of Air.	Weight of Dust under 50μ in mgm. per cubic metre.	Number of Millions of Particles in 1 mgm. Weight.	Calculated Average Diameter of Particles in Microns.	Weight of 'Very Fine' Dust per cubic metre.	Percentage by Weight of 'Very Fine.'	Percentage by Number of 'Very Fine.'	Average Diameter of 'Very Fine' in Microns.
A. (1) From air of Johannesburg, Fordsburg dip, near dump (1), strong south wind (2), during dust storm ..	(1) 100	25	3½	7	4·0	16	87	3·8
	(2) 25	17	1½	9·3	0·1	0·5	50	2·0
(2) Street, north wind, no electrical disturbance (twice)	(1) 35	4	9	5·0	2·4	60	91	4·3
	(2) 40	4	10	5·0	2·4	60	90	4·3
B. Mining road air disturbed by motor cars, Germiston (mainly quartzite and dump dust)	500	14	35	3·25	7	50	90	2·65
C. Dry-drilling (average of six) ..	9,500 (3,000-20,000)	124 (60—200)	75 (40—100)	2·52 (2·2—3·1)	89 (50—130)	72 (65—78)	98·9 (97·7—99·4)	2·20 (1·95—2·45)
D. Dry blasting—(1) 5 minutes after firing cut	86,000	503	171	1·91	470	93·5	99·85	1·87
(2) 15 minutes after firing cut	19,000	170	110	2·22	136	80	99·5	2·05
(3) Inside doors at station (three different mines) ..	62,000	366	169	1·92	331	90·5	99·72	1·86
E. Drilling with jet of water in hole, or can-watering of down holes (average of 5)	210 (80—330)	4·1 (2—6·4)	50 (30—55)	2·9	3·1	75	97·5 (95—99·5)	2·63
F. Drilling with promiscuous jet, bottom of hole usually dry (average of 9) (naturally very variable)	1,120 (400—2,200)	14 (3—30)	80 (33—140)	2·46	8 (2—13).	57 (30—75)	97·3 (94—99·7)	2·07
G. Dry "collaring" of holes (average of 3)	3,700	49	75	2·52	28	57	98·4	2·10
H. Blasting cut—(1) followed by 30 minutes best water blast	650	8·1	80	2·47	5·5	68	99·0	2·16
(2) 15 minutes later	350	5·7	61	2·70	4·2	69	99·3	2·44
I. (1) Crushers and sample houses on surface, 1913 ..	1,200	40	30	3·42	27	68	97·3	3·03
(2) Best 1915 conditions	(50—500)	(2—8)	(25—60)	(3—3·5)	(1·2—6)	(60—70)	(96—99)	3
J. Leyner drills (in good order) (average of 10) (very irregular)	210 (40—1000)	3·4 (2—5)	62	2·65	2·7	79	99·0	2·50

Note.—When latter are defective and cause a mist by atomising the water, the count goes up to 1,500 or 2,000. The feed-water on a certain mine was once found to contain 23,000,000 particles per cc.!
The figures in parentheses are maximum and minimum values observed.

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*In the Journal of the Chemical, Metallurgical and Mining Society

‡Haldane puts this figure four times higher.

to discover this property of gelatinous explosives (see Report of first Transvaal Commission on Miners' Phthisis and this *Journal* in 1903) as I find that text-books tend to ascribe it to Weiskopf or Cullen or E. A. Mann, who elaborated the discovery about five years later. The recent work comprises 47 accurate analyses for CO_2 and CO in samples taken during 1914 at the places where men wait to be hoisted after blasting, being part of a general survey of the Witwatersrand mines. The average value of the CO_2 was 0·248 per cent., and of the CO, 0·0156 per cent. (the iodic anhydride method was used on 3,500 cc. samples), giving an average ratio of 16 for CO_2/CO. The maximum CO_2 met with in such return air was 0·50 per cent. and the minimum 0·11 per cent.; whilst the CO varied between 0·078 per cent. and *nil*, nearly all being below 0·04 per cent. The ratio was extremely variable, six samples giving values under 10 (chiefly due to powerful spraying which dissolved the CO_2 and left the CO), whilst certain outcrop mines gave values of 200 or 300. If three high CO's probably expectional, be omitted, the average ratio of CO_2 to CO for the remaining 44 mines is about 20. In the previous year a survey of after-blasting gases was done over the Reef, 63 samples being taken 30 minutes after firing the cut. A water-blast was supposed to be in use, but sometimes was out of action or too small to be of any use. The average CO_2 found in these 63 samples was 0·316 per cent., the maximum figure being 1·50 per cent. and the minimum 0·10 per cent. The CO average was 0·028 per cent. (done by combustion in Levy apparatus, confirming by the blood-test when desirable): the maximum CO found was 0·11 per cent., and the minimum a trace. The average ratio was 11, varying from 4 to 200 or 300. Two or three tests for nitrous fumes were made, all giving blank results, as was to be expected 30 minutes after blasting in the presence of water. Ten special samples taken 30 minutes after the "cut" in a completely unventilated area of a certain mine gave $CO_2 = 1·046$ per cent. and $CO = 0·12$ per cent. on the average, which shows that 30 minutes is not long enough to wait after blasting under such circumstances. The worst gas encountered in this set gave $CO_2 = 1·40$, $CO = 0·20$ per cent., $O_2 = 17·80$ per cent., the latter being about the lowest figure for oxygen I have met with in a Rand mine. Mr. Jas. Gray, F.I.C., has done the most of the difficult gravimetric work in connection with this research. I also beg to acknowledge most valuable suggestions from Mr. R. N. Kotze, the Chairman, and from Mr. A. McA. Johnston, my colleague on the Committee.

SOUTH AFRICANS AS MINING ENGINEERS.

President of the Chamber of Mines Pays a Tribute to Traditions of Rand Engineers—Careers Offered by the Industry.

Mr. Samuel Evans presided last week at a function held at the School of Mines, when the President of the Chamber of Mines presented to Mr. T. C. A. Meyer the Chamber's Scholarship, which is for £250 for the purpose of permitting the successful student to carry out research work for one year. The scholarship carries with it a gold medal, and this will be forwarded to Mr. Meyer shortly.

Mr. W. H. Dawe, who made the presentation, said: As President of the Transvaal Chamber of Mines, I have been asked to come here to-day to assist in a little ceremony in which I am sure you are all keenly interested. I think it is pleasant and useful for representatives of institutions which are in any way connected with the mining industry to meet as frequently as possible in order that we might exchange views and get to be better acquainted with each other. The Chamber of Mines represents those on whose shoulders a very considerable amount of the responsibility for superintending our great industry rests, while the students of this college will, we hope, take prominent places in forwarding the welfare of the industry in the future. We have met here to-day in honour of one of your fellow-students, Mr. T. C. A. Meyer, who has won the scholarship and gold medal as the result of the 1914 examinations for the diploma in mining engineering. It might not be out of place if I briefly refer to the objects which the Executive Committee of the Chamber of Mines had in view when this scholarship was founded. In the first place, if I remember rightly, it was intended to mark a great step in advance which had been made in regard to the South African School of Mines and Technology by the completion of the first portion of the permanent building, and the Executive considered, and very rightly so, that it would be a practical method of showing its interest in and appreciation of the work of this school. It was also hoped that the scholarship and medal would create a like interest amongst the students and come to be regarded as the blue ribbon amongst the prizes which the school has to offer. It was also thought that, apart from providing special encouragement to students at the college to compete for the distinction, it would provide means for the successful student to undertake post-graduate research work, either in the Transvaal or in some other country, in connection with problems affecting mining and metallurgical practice in South Africa.

EXISTING CONDITIONS.

The conditions under which the scholarship has to be won are certainly exacting, inasmuch as the scholar must have attended the second, third and fourth year courses at the college for the diploma in mining and metallurgy, and have passed the examinations at the end of each of these years, with an aggregate of not less than 60 per cent. of the marks awarded. He must also have obtained distinction in the subjects, either of (a) mining, including the principles of mining and mining economics, and (b) metallurgy, including general and special metallurgy, and ore dressing; and last, but by no means least, his conduct and behaviour throughout the course must have been satisfactory in the opinion of the Council and the Senate. Among the regulations applying to the scholarship I might mention that the successful student has to submit to the Senate a *resumé* of the work he proposes to undertake during his tenure of the scholarship, and at the end of the year has to present a written report upon his researches. There is a further regulation which shows that the Executive of the Chamber had an eye to the main chance, and that is that the successful student, before proceeding to a course of research work, has to give an undertaking that at the end of the year he will practise his profession in the Transvaal for a period of at least two or three years.

RAND'S ENGINEERS.

We have always been proud to think that the engineers in all departments of the Rand gold mining indusrry have set and maintained a high standard of efficiency. The list of those who have assisted in setting this standard is a very long one, and during the years I have been connected with the industry it has been my good fortune to become personally acquainted with most of them. The mention of such names as Hennen Jennings, Hayes Hammond, Louis Seymour, and T. H. Leggett is sufficient to show what a wide field the Rand affords for building up a world-wide reputation. There are men of later date who will, I am sure, come to be as well known as the few I have mentioned, and the gold mining industry to-day affords ample opportunities for an honourable, and in many cases brilliant, career to those who work and qualify themselves for it. Perhaps there is an idea that some of the work on the mines is hardly of the class which students are fitted to undertake, that it is a matter of routine, and that they should be doing something more advanced; but a little reflection will show you that if your duties in the future are to be carried out successfully you must be thoroughly conversant with all sections of the work, and know how it should be done, and I venture to say that there is no man to-day in any of the highest positions of this industry who has not in his earlier years done much hard manual labour.

Rooiberg Minerals.

Appended are particulars of the operations on this company's property for August:—Stamps, 10; days concentrating plant run, 29·90; tons milled, 2,983 short tons; concentrates, 95 long tons; average assay value metallic tin, 68·88 per cent.; estimated profit, £2,513 3s. 7d.; adjustment in respect of previous shipments to be subtracted, £22 14s. 2d.; profit declared for the month, £2,490 8s. 5d.; net capital expenditure, £221 0s. 11d. The sum of £2,000 2s. 11d. has been included in working costs for the month in respect of shaft sinking, exploration and mine development. The average price of metallic tin on which the month's revenue has been determined is £150 8s.

Knight Central.

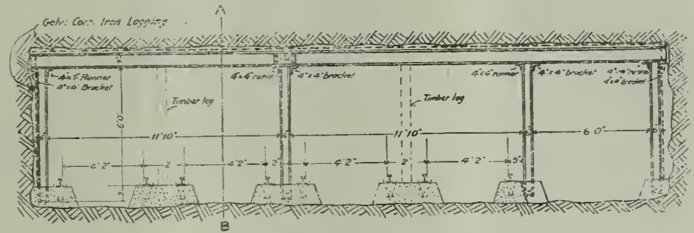
The following official statement was issued on Monday: The Main Reef has been intersected 17th level south of dyke, west shaft; average of four samples, 21·9 dwts. over 40 inches.

THE COLLAPSE AND RECOVERY OF THE BANTJES CENTRAL INCLINE SHAFT.—II.

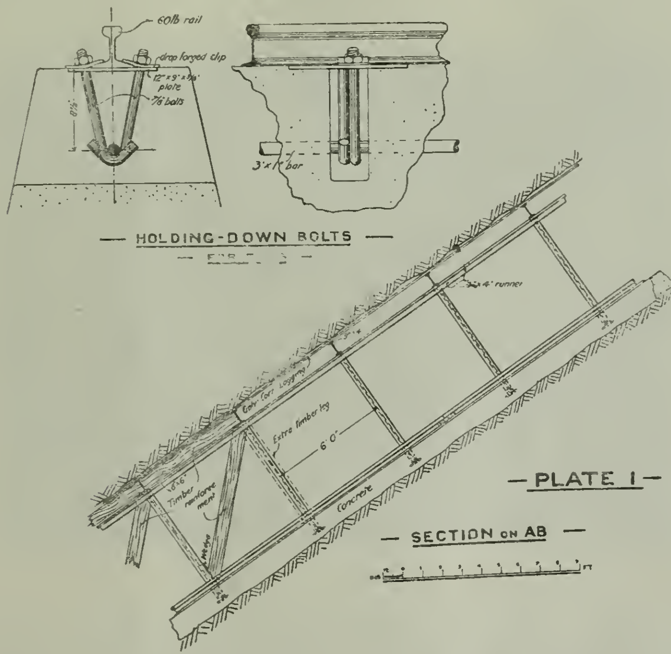
By PERCY CAZALET and W. W. LAWRIE.*

DETAILS OF TRAVELLING SETTS (PLATE 3).

Five complete setts of timber were used, consisting of 10in. caps, 14 feet long, made in two halves for convenience in handling, with a scarf joint in the centre. The legs or dividers were of 10in. by 8in. timbers, 3ft. 6in. long. The setts were tied together with studdles and chains with short hook bolts, instead of the usual hanging bolts. The chains and hook bolts allowed of a great variation of centres, and enabled the setts to be easily taken adrift. The height of the travelling setts depends on the height of the permanent work to be put in. They should be of such a height that the permanent caps do not interfere with the free use of the hammer when driving the rails, while at the same time giving the maximum weight possible for convenience in working. (See Photo 4.) 6in. by $\frac{1}{2}$in. steel plates (to reduce friction) were bolted on the caps, and to ensure that the rails travel parallel to the shaft the caps should be pegged, the distance between the rails being 6 inches. If this is not done it is found that the rails tend to collect towards one end of the cap. To prevent the setts from travelling downhill as the fallen ground was drawn off in advance, every second sett was anchored back by two long $1\frac{1}{4}$in. steel hoisting ropes provided with large turn-buckles at their upper ends for making them taut. The driving of the rails presented no difficulties, travelling right through the full 95 feet of fall with very few renewals and with but little exertion on the part of the native strikers.



— VIEW DOWN SHAFT —



— HOLDING-DOWN BOLTS —

— PLATE I —

— SECTION ON AB —

PERMANENT CAPS.

The permanent caps were of 10in. by 10in. pitch-pine, fitted on the top with boxing (see Plate 3), which makes it possible to place short lagging on the caps and to renew this lagging easily. The caps were put in at 20in. centres, and were hung from one another by 1in. bolts and links. The safe distance which the travelling setts could be advanced ahead of the permanent work was not more than 22 inches, and that distance was only obtained by putting the short lagging into the boxes on top of the last permanent cap, and keeping them in place by spikes through temporary blocks nailed at the side of each box. The permanent caps, after being placed in position under, and as close as possible to, the lagging, and after the links and bolts had been fastened up, were jacked into position by two 50-ton hydraulic jacks.

SUPPORTS FOR PERMANENT CAPS.

Attempts were first made to support the caps on 10in. by 10in. dividers, resting on 6in. softwood footboards, with a 5in. hardwood corble against the caps. These dividers stood the pressure all right, but it was found impossible to prevent the caps from being forced down the shaft, and thus taking the dividers out of the square, even when these were set as much as their own width out of the normal. It was, of course, impossible to put in bearers on account of the running nature of the ground, and the only other alternative was to anchor the setts with wire ropes. These ropes ($1\frac{1}{4}$in. steel hoisting ropes) were anchored to the concrete stringers higher up in the shaft and fastened to the caps by means of $1\frac{1}{2}$in. eyebolts. They were from 60 feet to 100 feet long, and were made taut by large turn-buckles. The creep of the caps continually stretched the ropes to near breaking, but in all cases it was the eyebolts which fractured and not the rope. After all attempts had been made to overcome the downward creep of the setts it was decided to try whether concrete walls, built up on the existing concrete stringers to such a height as to form both a support and anchorage for the caps, would solve the difficulty. The unusually large clearance of 24 inches between the tracks made it possible to put in fairly thick walls, and thus made for the success of the idea. By planing down the wide tread rear skip wheels of 5in. to 3in. tread and altering the headgear tip it was possible to make these walls 15 inches in width. In the meanwhile the first caps put in hand had been subjected to pressure and movement, and were pushed out of alignment. These, for the sake of speed, were left as they were, and concrete piers were built up under them. When the concrete was set, and advance was again made, the new caps were fastened to these caps by hanging bolts, and also anchored back by wire ropes fastened to every sixth cap. Where possible the caps were further supported by means of 10in. by 8in. diagonal struts off the footwall of the shaft pending the setting of the concrete. These first concrete piers or walls fractured somewhat under the strain, but as they were extended down the shaft they soon became strong enough to catch up and hold the strain, and have held up since then most satisfactorily.

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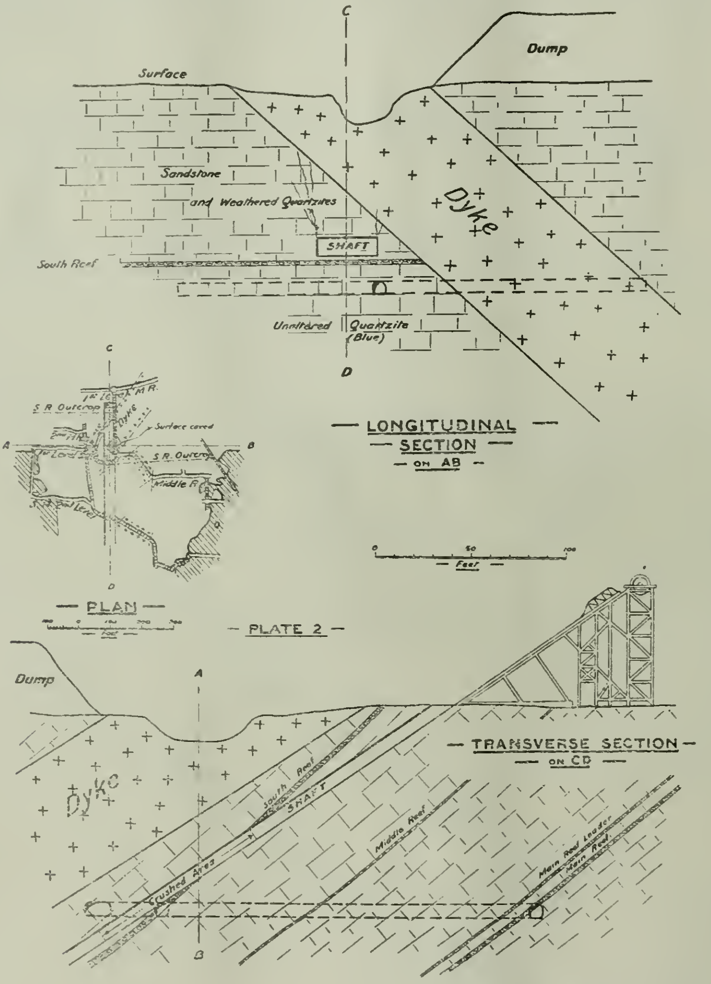
* Paper read before S.A.I. of E.



— LONGITUDINAL SECTION — ON AB —

— PLAN —

— PLATE 2 —

— TRANSVERSE SECTION — ON CD —

TEMPORARY SUPPORTS AND PREPARATORY WORK FOR CONCRETE WALLS.

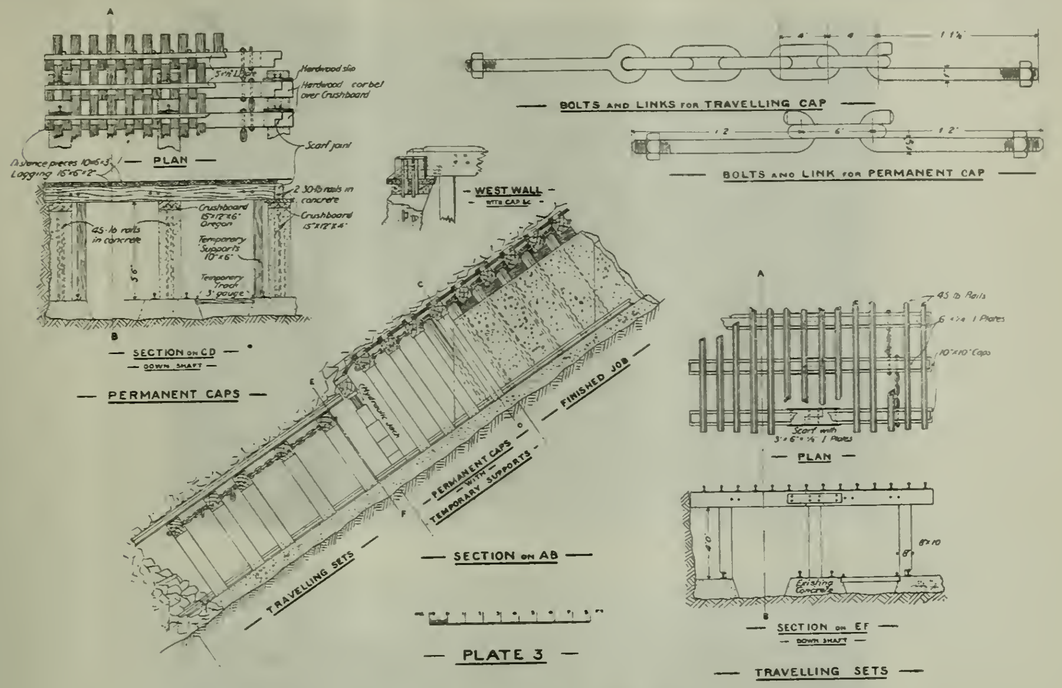
The caps, after being jacked into position, were supported by temporary 10in. by 6in. legs. Two legs only were necessary, one at each end. A centre leg would have added to the difficulty of swinging the caps into position. It is, however, an easy matter to put in a centre leg and move it to a fresh position when necessary should the pressure on the cap make an additional leg advisable. Plate 3 shows the position of these temporary legs and the 3ft. track laid down. The legs rested on the edge of the concrete stringers and the permanent rails, the foot being cut so that the pressure was taken up by the rail as well as the concrete. When in this position the legs formed the uprights for the housing of the concrete boxes.

DETAILS OF CONCRETE WALLS.

The end walls vary in width according to irregularities of the side of the shaft, but all others are 15 inches wide. The walls are 5 feet in height, surmounted by a 15in. by 12in. by 6in. crush-board, on which the caps rest. Forty-five-pound rails, 5 feet to 6 feet long, are set in the concrete one inch below where the caps are to lie. These rails project twelve inches above the wall and take the sliding thrust of the caps, and act (through being embedded in into the concrete) as bearers supported off the footwall alone. To prevent the rail from crushing into the caps hardwood filling pieces were inserted between the rail and caps. The west end of the caps was cut so as to form a scarf joint with the east end of the caps to be put into the western portion of the shaft. To increase the bearing portion of the caps at this end they rested on hardwood corbles set out two inches from the wall, while these crush-boards were reduced to four inches in thickness. It is, of course, necessary when using such an unyielding substance as concrete as the legs on which the caps are carried to supply some form of cushion to take up the crush, as otherwise the caps would themselves be damaged, and thereafter, when the limit of their compressibility was reached, the concrete might tend to split and slab off the edges. To prevent this and the needless replacement of the caps themselves, which would be expensive, 6in. Oregon pine crush-boards were laid on the top of the concrete under the permanent caps, and these, as they crush and before their spring is gone, will be renewed by jacking up the cap and substituting a new crush board. The hardwood filling between the back of the cap and the 45lb. rail bearer tends to spread the crushing action of the creep down the shaft over a larger area than if the cap pressed directly against the rail, and so also prevents damage to the cap.

PREPARATION OF THE CONCRETE.

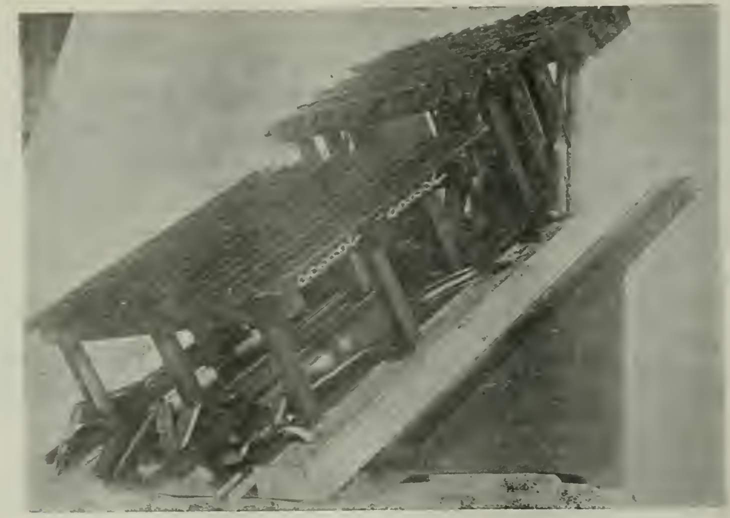
The concrete was mixed on the surface as required, and sent down to the work in small drums of about .6 cubic feet capacity, placed in the drill trolley. The mixture found best was $3\frac{1}{2}$ parts



— PLATE 3 —

View of Model 1.
Showing equipment and support of incline before accident, also timber reinforcing completed in the two eastern compartments since the accident in that portion of the shaft which did not collapse.

washed mine rock screened through 1¼in. screen, 1½ parts washed road sand to 1 part of quick-setting Pretoria cement. The whole was thoroughly mixed dry, the water only being added immediately before being sent down. The surface of the concrete stringers was stepped, chipped and well watered to ensure a good joint with the wall, while the ends of the separate sections put in were dovetailed and left roughened to provide for good contact with the following sections. The walls followed as close as possible to the advancing face, but sections of concrete were never made less than six feet in length. The concrete had set sufficiently in 24 hours to allow the boxing to be removed. After another two or three days the 6in. crush-boards were put in between the walls and the caps, and the walls allowed to take the weight. The walls were extended a distance of 40 feet above and 45 feet below the fall, making a total length of 180 feet. The wall below the fall was put in hand, and had set before the travelling sets holed, and was used for supporting the lower portion of the fall when cutting through the girders at the bottom of the cave, the weight of the permanent caps at holing being taken up on the three lower walls, thus allowing of the removal of the anchor ropes, etc., while the last section of the concrete walls to be put in was setting. In an accident which practically hangs up all the work of a mine the cost of repairs is of small consideration compared with the time taken to effect the same. It is, of course, impossible to compare the cost of these repairs with that of any other method which might have been employed, but we are of the opinion that the cost was reasonable and less than would have had to be expended by the employment of other methods. The estimated cost of recovering and equipping the three west compartments, which are as yet unrecovered, is from £1,600 to £2,000. The accident occurred on the 19th December, 1914, and hoisting was recommenced on the 19th February, 1915. The shaft was therefore hung up for two



View of Model 2.
Indicating successive methods of recovery of collapsed portion of theshaft, showing travelling setts and "spiling" rails in foreground with permanent caps and portion of concrete walls in background.
(N.B.—Note twisted steel work and broken lagging not yet removed, under travelling setts.)

No. 2. Lower end of fall (looking east) showing duplicate steel setts, both totally and partially collapsed.

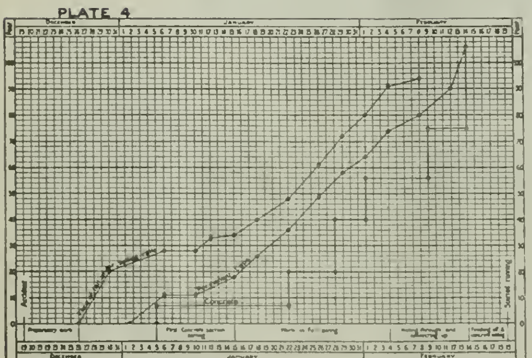
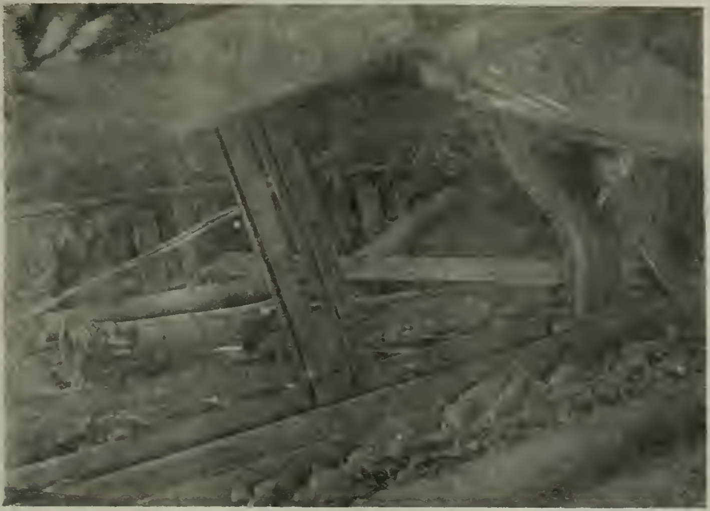
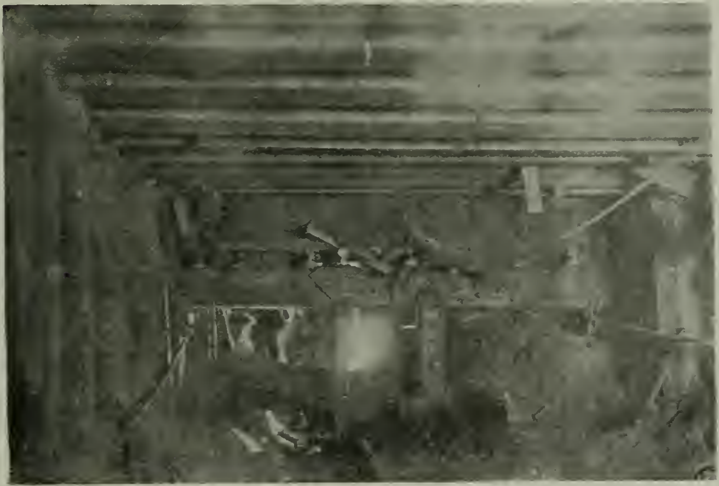


Plate 4. Speed diagram of recovery work in Incline.

months or 62 days. The first ten days were employed in doing preliminary work and the work connected with getting the pumps restarted. The difficulties met with after making a fair start, and which would have been common to any method employed, delayed us a further 14 days, and it was only on the 12th January that the work could be said to be in full swing. The principal delay was caused by the attempt to prevent the caps from "creeping" down hill, all of which work failed until the concrete walls were built. A further delay was then necessary because at first no quick setting cement was available, and the first section of the walls was built with ordinary cement. Plate 4 is a record of the speed of work done. It will be seen from this that on the 15th January the travelling setts had 60 feet to advance before getting through the caved ground. This distance was covered by the 4th February, or an advance of 3 feet per day. It is impossible in this paper to refer to the many difficulties met with in the work just described, and the steps taken to overcome these difficulties as they arose. It is enough to say that all difficulties were overcome without accident to life or limb, and that the details of the work, as described in this paper, are the record of the methods found in practice most suited to overcome the many difficulties and problems which arose in the recovery and re-equipment of the incline. A start with the recovery of the remaining three compartments may, it is hoped, be undertaken shortly, when during August or September or October the work would be sufficiently advanced to allow of those members who are interested in this unusual piece of work seeing the method here described is actual operation.



No. 3. Lower end of fall (looking west), showing duplicated steel setts bent and twisted.



No. 4. View showing top travelling sett with "spiling" rails; also permanent caps supported on temporary legs.

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*From Journal of the South African Institution of Engineers.

efficiency of men. A word as to the heat mechanism of the human

THE AUGUST GOLD OUTPUT IN DETAIL.

Increase of £35,717—Improving Labour Position—Some Excellent Returns.

The Transvaal gold output for August was declared by the Chamber of Mines last week to be 778,763 ozs., value £3,307,975, which is 8,408 ozs., value £35,717, better than the output for July. The Witwatersrand total for August shows an increase of 7,062 ozs., value £30,001, notwithstanding that the number of stamps dropping was eight less than in July. The native labour returns show a substantial improvement, the number of boys employed on the goldfields in August being 196,866 as against 190,026 in the previous month. The group profits for August amounted to £962,188 as against £937,514 in July, an increase of £24,674. The output figures for July and August, as officially announced, are as follows:—

WITWATERSRAND.

	Ozs.	Value.
July	742,510	3,153,980
August	749,572	£3,183,981
Increase ...	7,062	30,001

OUTSIDE.

	Ozs.	Value.
July	27,845	118,278
August	29,191	123,994
Increase	1,346	5,716

GRAND TOTAL.

	Ozs.	Value.
July	770 355	3,272,258
August ...	778,763	3,307,975
Increase ...	8,408	35,717

In the list of individual returns given below many substantial increases are shown, including the following:—Modderfontein B, £11,193; Ferreira Deep, £11,104; East Rand Proprietary Mines, £8,580.

THE STAMP POSITION.

In August 9,955 stamps were dropping on the Transvaal goldfields as against 9,939 in July, an increase of 16. The official figures are as follows:—

	Rand	Outside.	Total.
July	9,415	524	9,939
August	9,407	548	9,955
Increase ...	—	24	16
Decrease ...	8		

NATIVE LABOUR.

For the last three months the figures are as follows:—

	June.	July.	August.
Gold mines ...	184,155	190,026	196,866
Coal mines ..	9,019	9,371	9,943
Total ...	193,174	199,397	206,809

INDIVIDUAL RETURNS.

The following are the individual returns of the Witwatersrand mines:—

THE WITWATERSRAND.

	Ozs.	Value. £	Inc. £	Dec £
Aurora West	4.261	18,100	—	552
Bantjes Consolidated	5,568	23,651	892	—
Brakpan Mines	21,002	89,211	—	1,525
City and Suburban	12,076	51,296	175	—
City Deep	29,090	123,605	—	633
Consolidated Langlaagte	16.493	70,058	1,644	—
Consolidated Main Reef	9,496	40,336	—	319
Crown Mines	63,603	270,168	—	3,526
Durban Roodepoort	3,457	14,684	—	73
Durban Roodepoort Deep	8,879	37,716	—	233
East Rand Proprietary Mines	53,555	227,487	8,580	
Ferreira Deep	22,783	96,776	11,104	—
Geduld Proprietary Mines	9,284	39,436	1,054	—
Geldenhuis Deep	16,918	71,863	2.948	—
Ginsberg G.M.	4,166	17,696	—	314
Glencairn Main Reef	3,310	14,060	—	514
Government Areas	15,398	65,407	731	—
Knight Central	6,906	29,335	2,468	—
Knights Deep	18,187	77.254	3,883	—
Langlaagte Estate	14.377	61,070	1,525	—
Luipaardsvlei Estate	5.967	25,346	2.043	—
Main Reef West	6,707	28,490	—	1,427
May Consolidated	2.599	11.040	51	—
Meyer and Charlton	8,090	34,364	442	—
Modderfontein B.	22,931	97,405	11.193	—
Modderfontein Deep Levels	14,691	62,403	—	1,623
New Goch	7,001	29,738	—	68
New Heriot	5,512	23,413	—	81
New Kleinfontein	16.608	70,546	—	846
New Modderfontein	24,184	102,737	—	2,604
New Primrose	4,602	19,548	663	—
New Rietfontein	1,190	5.055	—	1,427
New Unified	3,315	14.081	21	—
Nourse Mines	16,480	70,003	—	1,762
Princess Estate	6.780	28,800	192	—
Randfontein Central	58,726	249,452	5.441	—
Robinson G.M.	19,332	82,117	866	—
Robinson Deep	18,737	79.590	1,483	—
Roodepoort United Main Reef	7,196	30.567	1,555	—
Rose Deep	20,493	87,049	4.584	—
Simmer and Jack Proprietary	17,259	73,311	—	10,424
Simmer Deep	11,302	48.008	1,848	—
Van Ryn Estate	10.955	46,534	2,787	—
Van Ryn Deep	18,633	79,143	—	1,058
Village Main Reef	13,083	55,573	1,104	—
Village Deep	18,649	79,216	—	510
Vogelstruis Estate	2.849	12,102	—	2.047
West Rand Central	614	2,608	—	128
West Rand Consolidated	9.275	39,398	—	488
Witwatersrand G.M.	12,474	52,936	—	1,687
Witwatersrand Deep	12,461	52,931	—	3,530
Wolhuter G.M.	10,415	44,240	1,283	—
Miscellaneous producers	—	6,983		3.160

OUTSIDE DISTRICTS

	Ozs.	Value. £	Inc. £	Dec. £
Nigel G.M.	3.581	15,211	—	459
Sub Nigel	3.515	14,931	2.150	—
Barrett G.M.	383	1.627	561	—
Sheba G.M.	2,346	9,965	450	—
Worcester Exploration	714	3,033	—	650
Glynn's Lydenburg	1,734	7.366	230	—
Transvaal Gold Mining Estates	7,337	31,166	—	1.771
Ceylon Lydenburg	220	934	38	—
Quest G.M.	658	2,795	38	—
Fairview (T.C.L.)	774	3,288	123	—
Rietfontein (T.C.L.)	318	1,351	—	59
Miscellaneous producers	—	32,327	5.065	—

GROUP PROFITS.

Following is a list of the profits returned for June, July, and August:—

	June.	July.	August.
Central Mining	£261,755	£268,153	£278,268
Rand Mines	191,004	185,312	197,227
Gold Fields	78,554	78,719	75,764
East Rand Proprietary ...	52,020	55,548	56,049
Kleinfontein	22,103	24,222	23,027
Barnato	134,792	135,782	136,953
Albu	62,012	58,246	63,860
Neumann	52,719	50,672	49,152
Mines Selection	29,653	32,181	32,812
Goerz	43,126	48,679	49,076
Totals	927,738	937,514	962,188

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PLATE 4. Speed diagram of recovery work in Incline.

unusual piece of work seeing the method here described is actual operation.

MONTHLY RETURNS.

The following table gives the monthly returns for the past four years:—

	1912.	1913.	1914.	1915.
	Ozs.	Ozs.	Ozs.	Ozs.
January	737,060	789,390	651,753	714,984
February	703,886	734,112	626,261	676,229
March	*830,723	790,552	686,801	753,935
April	737,660	784,974	683,877	744,080
May	779,662	794,306	720,229	763,548
June	753,936	747,077	717,926	755,280
July	766,338	655,389	732,485	770,355
August	764,737	728,096	711,918	778,763
September	747,893	706,186	702,170	
October	768,681	718,431	733,746	
November	757,337	673,486	715,836	
December	776,406	672,815	695,137	

* Including gold reserves extinguished.

THE INFLUENCE MOISTURE IN THE AIR HAS ON MINE VENTILATION.

Contribution by A. J. Orenstein, M.D. to Discussion of Paper by A. C. Whittome

MR. WHITTOME'S paper has interested me very much indeed, and I am exceedingly obliged to Mr. Izod for bringing it to my attention, and to your Instiuttion for the kindness of permitting me to put before you certain considerations that suggest themselves to me as the result of the perusal of Mr. Whittome's paper. First and foremost I wish to say that I consider Mr. Whittome's paper a most valuable contribution to the study of ventilation—a study which engages the attention of so many able workers. It is a source of great satisfaction to know that ventilation is receiving the careful consideration of the members of the Institution. I, for one, feel sure that a great deal of good will result. I think the Institution is to be congratulated on the acquisition of Mr. Whittome's paper. I desire briefly to lay before you a few thoughts that suggest themselves to me. First of all regarding the relation of the physical and chemical properties of air to the physiological functions of the human body. It does not seem clear to most people that modern research has shown that the older teachings are erroneous, and that only very great deflections from the usual O and CO_2 content of so-called fresh air, such as are very rarely met with under ordinary conditions, are harmful to life and health. As early as 1883 Hermann (Arch. f. Hygiene, 1883, 1 [1] showed that the O content may be reduced to 15 per cent. and the CO_2 increased to 4 per cent. without in any way harming man. More recently it was shown that O may be lowered so far as 13 per cent. or raised to 50 per cent. and higher without the slightest apparent influence on vital functions. A reduction to one-half the usual O content (which is 23·2 per cent. by weight) becomes dangerous, however. It must be borne in mind that only about one-quarter of the inspired O is absorbed. Taking Foster's average of 34 lbs. of air for the 24 hours for an average person, it follows that he would inhale about 7 lbs. of O and absorb about 1·75 lbs. This O requirement it is apparently easy for a normal individual to obtain under enormous variations of air conditions in pressure, temperature and chemical composition. Recent experiments just published (Winslow *et al.*, *American Journal of Public Health*, vol. 2, 1915) show that variations of air temperature from 68 degrees F. at 50 per cent. relative humidity to 86 degrees F., at 80 per cent. relative humidity failed to show any apparent differences in the respiratory phenomena, even when the air was made entirely stagnate, so that the CO_2 content averaged 3·2 parts per 10,000. and the temperature was 86 degrees F. dry bulb and 81 wet bulb, giving a relative humidity of 80 per cent. There is a great deal of evidence on this phenomenon in the works of Rubner, Flügge, Haldane, Boycott and others. Suffice it to say here that the respiratory function becomes embarrassed by air changes very much later than other vital functions, and that the problem of ventilation, when approached from the hygienic point of view, is viewed from a wrong angle when undue prominence is given to the effect of air on the respiratory function. For practical purposes of mining engineering it is far more satisfactory to view the problem of ventilation from the standpoint of the phenomena connected with the heat regulation of the human body. This vital function is attacked by unsatisfactory air conditions much earlier than the respiratory function, and, for all practical purposes, if we secure air conditions under which the heat-regulating functions of the body are not unduly taxed, we can rest assured that the air is also quite satisfactory for respiration, provided, of course, foreign toxic substances are absent. When approached from this point of view, the problem is very much changed. Roughly speaking, it changes from a complicated chemical problem to a comparatively simple physical one. By thus approaching the problem, we also avoid falling into the serious error of providing air which, although excellent from a chemical point of view and supplied in sufficient volume, may yet seriously impair the vital functions and, incidentally, the working body. The human body generates, under average conditions, a good deal more heat than it requires, and this excess is got rid if in two ways: (I) By transfer-conduction, radiation, and convection; (2) by evaporation, chiefly through perspiration. When the air temperature reaches 70 degrees F. the temperature of the human body would begin to rise were it not that perspiration then commences. If atmospheric conditions are such, however, that free evaporation of the perspiration is impaired, as occurs in high atmospheric humidity, an attempt is made by the body to rid itself of the excess heat by a rush of blood to the skin, causing an increase of surface temperature and a loss of heat by transfer. But in high humidity, plus high temperature, as obtains, say, with a wet-bulb temperature of 80 and over, the last phenomena are interfered with. The rate of heat transfer also varies with the rate of air motion, heat radiation varying as the square root of the velocity of the air (Hill, *Recent Advances in Physiology and Bio-Chemistry*). It has been shown experimentally (Haldane, *Journal of Hygiene*, 1905) that in an air current of 107 linear feet per minute a wet bulb temperature of 93 degrees F. could be borne without abnormal rise in body temperature, whereas in still air the limit is 88 degrees F. wet bulb. These experiments were carried out with the body at rest. Work, however, causes an increase in heat production, and experiments on subjects performing muscular work showed that even in a current of 135 linear feet per minute 87 degrees F. wet bulb was beyond the limit of thermal balance. A number of workers have demonstrated that high wet-bulb temperatures—*i.e.*, temperatures above 80 degrees F. wet bulb—speedily upset the thermal balance of the human body, unless it be kept at complete rest, interfere with metabolism, and reduce working efficiency, and that all of these deleterious effects are produced quite independently of whether the air is rich or poor, within limits considerably wider than those met with in actual practice, in O and CO_2. The highest wet-bulb temperature I have observed in what is said to be the hottest mine on the Rand was 25·2 degrees C., or 77·4 degrees F. This is very close to the critical point for a place where hard labour is to be performed. The dry-bulb reading was only 0·2 degrees C. higher, thus showing a relative humidity of very close to 100 degrees. In passing, I may remark that the question of condensation of water within the lungs need not worry the mining engineers of the Rand, for, aside from the fact that Mr. Whittome's deductions on this point are not applicable, as the lungs cannot be regarded as inanimate vessels, governed solely by the laws of physics, unless some way is discovered to keep the mine temperatures considerably below the temperature of the human body—that is, below 98 degrees F. wet bulb—work in the mines will have to cease, because it is quite impossible to maintain efficient continuous labour in such a temperature. The vital problem before the mining engineer is not how much O he needs to send underground, nor yet how much CO_2 he must remove; both of these substances can easily be controlled well within the margins of safety. The problem before him is to keep the wet bulb temperature at the working faces below 75 degrees F. To solve this problem it is quite unnecessary for him to know how much air a man inhales at various degrees of pressure, temperatures and humidity, nor yet whether there would be condensation within the lungs. It is demonstrated that within ranges of temperature, humidity and pressure far greater than will ever be met with in mining practice on the Rand, the human lungs are capable of absorbing O in sufficient quantity not to embarrass vital functions, and that, long before respiratory embarrassment is evidenced, high wet bulb temperatures so react upon the heat-regulating mechanism as to produce grave disturbances in vital functions and seriously impair the capacity for muscular and mental work. To summarise: The outstanding problem before the deep-level miner in connection with ventilation is how to secure and maintain throughout the mine, a wet bulb temperature below 75 degrees F. In solving this problem he shall have *eo ipso* solved the problems of O supply and CO_2 removal. The mining engineer must bear in mind the following essential facts: (1) It is the wet-bulb temperature that he must watch. Dry-bulb readings are misleading and non-significant. (2) He must keep the wet-bulb reading not higher than 70 degrees F., if at all possible—certainly below 75 degrees F. Health commences to suffer and working efficiency to drop when the wet-bulb readings reach 70 degrees, and the working efficiency curve descends very precipitously beyond 75 degrees F. (3) At temperatures of 70 degrees F. wet bulb and higher a considerable measure of relief can be afforded by keeping the air in motion (Haldane, *Journal of Hygiene*, 1905). (4) That in all cases more work can be done in gently-moving than in stagnant air. Dr. Orenstein added that in spite of the fact that he had said that Mr. Whittome's deductions in reference to the condensation of water in the lungs were erroneous, he still believed that Mr. Whittome's bringing up of the subject was a valuable contribution to general knowledge of ventilation on the Rand.

WRIGHT'S ROPES.

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*From Journal of the South African Institution of Engineers.

efficiency of men. A word as to the heat mechanism of the human

Rhodesian Section.

LATEST MINING NEWS.

North Charterland Exploration—Bell Reef Development—Lonely Mine August Output—Golden Kopje—Rhodesia Consolidated—Romola Nigel Star Property—Rhodesia, Ltd.

The directors of the North Charterland report that the profit and loss account for the eighteen months to December 31, 1914, shows a debit balance of £5,427, which increases the total debit balance to date to £16,314, of which £4,029 represents preliminary and new issue expenses. Steady progress was made in the agricultural development of the concession, particularly in tobacco growing. During the period under review, approximately 26,415 acres of land were sold, making a total ot 87,340 acres disposed of during the last five years. In addition 45,044 acres were under option to settlers at December 31, 1914, in respect of which £1,252 has been paid on account. A fair crop of cotton was realised for the 1913-14 season, and the bulk of it has either been shipped to England or is on its way home, but owing to the war, prices have been 2d. or 3d. per pound less than early in 1914.

* * * *

The directors of the Bell Reef frankly admit that their well-intentioned plans have fallen short of expectations. At the annual meeting the chairman said: "We must attribute the original inadequacy of the plant to our and our engineer's well-meant endeavours to combine due efficiency with reasonable economy, and we must perforce now recognise that the plant as erected had not sufficient capacity to deal with the estimated tonnage, insufficient margin having been allowed, and it has also been found necessary to incur considerable expenditure in order to increase the power plant, and also to authorise additional expenditure in connection with other parts of the reduction plant."

* * * *

The following are the particulars of output from the Lonely Mine for the month of August, 1915:—Mill ran 675 hours; crushed 5,000 tons; yield of fine gold, 559·185 ozs., value £2,350 13s. 1d.; slimes treated, 5,000 tons; yield of fine gold, 2,174·055 ozs., value £9,141 8s. 1d.; total recovery of fine gold, 2,733·240 ozs.; total value, £11,492 1s. 2d.; estimated profit, £3,892.

* * * *

For the poor results shown in the report of the Golden Kopje covering the twelve months ended with March 31 last there are two explanations—one the inefficiency of the plant, and the other, difficulties in mining which could not have been foreseen and which only arise in actual operations. In each respect, these difficulties are, by experience, being surmounted, and there is not only the possibility but the probability that during the current year improved results will be shown. At the end of 1913 the ore reserves had an estimated value of 8 dwts., but the extraction has been far below the figure called for in consequence of the nature of the ground in which workings have been carried on. In places, the rock is soft and pulverises, which means that not only is an excessive quantity brought down in blasting, but that it is impossible to sort it, and it must of necessity be sent to the mill. The dual effect of this is that tonnage is increased and value proportionately decreased. Mr. Piper's report is quite frank on the subject, and with the removal of the difficulties he is convinced that the Golden Kopje mine will eventually produce ore to the expected value. As an instance of caving, it may be mentioned that where the width of the stopes was originally estimated at 5 ft. the actual width has proved to be 14 ft.

* * * *

In the balance sheet of the Rhodesia Consolidated for the twelve months ended March 31 last investments which cost £173,259 were valued where quoted at £51,919, the prices taken being those ruling at July 27, 1914. Loans and sundry debtors have risen from £34,060 to £44,534, and the company has borrowed an amount which, with interest, comes to £4,565. The total revenue for the past twelve months was £4,889, against £6,907, this being due to reduced sales of land. The average profit per acre sold was 5s., as against 4s. 9d. in the preceding year. A number of claims has again been abandoned, and at the date of the balance sheet the company held 390, the total land holdings being 457,118 acres.

* * * *

The manager of the Romola Nigel's "Star" property in Rhodesia reports for August that the mill had been started, but only worked intermittently for sixteen days, producing 100 ounces from development and rubble. The cyanide treatment tanks were also not ready until late in the month, and no clean-up had been made, but normal returns might be expected for September. Development for the month was as follows:—East drive, driven 29 ft.; average assay value for month, 10·64 dwts. across 24·5 inches. West drive, driven 21 ft.; average assay value for month, 22·75 dwts. across 32·5 inches.

* * * *

For the year ended December 31, 1914, the profit and loss account of Rhodesia, Ltd., shows a net loss of £1,061 carried to the balance sheet, as against £4,054 for the previous year. The revenues of the Town Properties of Bulawayo, Ltd., are still sufficient to meet the whole of their annual charges, including the interest in full on the whole of their debentures, £68,000 of which and interest thereon are guaranteed by Rhodesia, Ltd. Mines and mining plant thereon and other mining claims, £319.845.—The increase of £5,089 in the amount at which these assets appear in the balance sheet is practically the cost of the development work done at the Sabiwa mine during the year, less the amount written off in respect of other mining claims. Of these 60 were sold during the year and 310 abandoned as of no further value. Sabiwa mine.—The general manager's reports continue to emphasise the importance of this property, which, he states, promises to become one of the largest and most valuable mining propositions in Rhodesia. The developments carried out during the year confirm that opinion. The rock intrusion (referred to in the directors' report for 1913 as encountered at a depth of 550 feet) entailed much extra work and expense. The work accomplished under the intrusion during the past year has demonstrated that the lode there is as strong as above, and that values are fully maintained at depth. The total mining footage accomplished during the past year, shaft sinking, winzes, drives, crosscuts, and chambers, was 865 feet. The greatest depth attained is 599 feet. The total ore reserves in the mine opened up at December 31 last were estimated at 171,541 tons. of an average value of 11·7 dwts., against 153,791 tons of a similar value at the end of the previous year. The general manager reports that in his opinion sufficient work has been done to prove that the mine fully warrants the company submitting it for flotation in normal times as a sound mining investment. During the year two farms were sold, reducing the company's holding from 111,565 morgen (about 236,536 acres) to 102,337 morgen (about 216,972 acres). Abnormal rains have fallen during the past wet season, and much improved results, both agriculturally and pastorally, are confidently anticipated. Three of the Johannesburg stands were sold during the year at prices showing a profit on the figures at which they stood in the books. Cash and bullion stand at £13.292. Having regard to the abnormal conditions since the outbreak of the war, expenditure has been curtailed and economies effected as much as possible with a view to conserving the company's cash resources till more normal times. Generally—Sabiwa mine and Glass' Block ranch are still the company's most valuable assets. The policy pursued during the year of concentrating expenditure on the Sabiwa mine has been fully justified. There are other properties owned by the company which well warrant development, which should be taken in hand immediately times are opportune. The company's ranch has been very largely increased in value by the operations there during the year. The development of the country is still retarded through lack of capital.

NOTICE: To Mine Managers & Others

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Mine Safety, Sanitation, and Welfare Bulletin.

MISCELLANEOUS MINE ACCIDENTS.—II.

[By C. E. Hutton, Inspector of Mines, Germiston District.]

Various, Underground.

The 982 accidents placed under this head are very varied, and to deal with them so that the causes may be clearly seen, I will give the detailed classification as shown in the Government Mining Engineer's annual report:—

	Separate Accidents.	Persons Killed.	Injured.
1. Trucks and tramways ...	233	23	214
2. Falling of material ...	412	47	378
3. Falling in shafts or excavations	68	41	35
4. Struck by cage or skip ...	47	20	30
5. Breaking of haulage ropes	12	8	13
6. Travelling by ladder ...	7	4	3
7. Overwinding	14	21	21
8. Electricity	4	2	3
9. Inundation of water ...	1	5	1
10. Burning and scalding ...	6	2	12
11. Falling and slipping ...	40	—	40
12. Splinters	85	—	85
13. Sundry	53	1	52
	982	174	887

I will deal with the first seven items, as the others are more or less self-evident.

Trucks and Tramways.

In tramming underground the 29 odd million tons mined during 1914, there were 233 accidents accounting for 23 deaths, and injuries to 214 persons. The majority of the drives in these mines are what is usually termed " single " drives, the tramming track being laid practically central, and the boxes serving the stores project into the drives. Tramming with say 16 cubic feet trucks running loaded on a 1 per cent. grade, often have a speed of five or six miles per hour, with the consequent result that a collision between a derailed truck and an oncoming one is of a somewhat violent nature, and unless the tramming natives are particularly wide awake and agile, they are apt to meet with severe injuries at times. Derailment of trucks are fairly frequent owing to spillages from boxes or other causes, and unless the train of trucks is run with a fair distance between one and another, accidents are bound to happen. There is generally a great improvement in the conditions of tram tracks when compared with the old day 12 lb. rail, but we still lack width of drive. One experiences an uncomfortable feeling when walking along a drift, to suddenly see a 16 c. ft. truck bearing down on one at a rapid rate, and no refuge hole handy—that is for a portly person. During the year many of the reported accidents have been caused by natives being crushed by trucks against the walls of the drives. My only suggestion to lessen somewhat this evil, is that in the new development work the drives be carried a foot or so wider than they have been generally in the past, and so make a wide space at the side of the track for safe walking. Accidents happen through trucks entering stations at such a high speed that the station boys in spraggling the wheels often get injured. In the everyday work of filling trucks from boxholes, and transporting the contents to the grizzlies, there are bound to be many minor injuries inflicted, and this probably will always be so; but the number of fatal accidents ought to be reduced if the loaded trucks are always kept under proper control, and tracks in good order. Another source of fatal accidents is the running away of trucks down winzes or incline planes before they have been attached to the hauling rope. It is a common practice to have a flat sheet at the end of the rails on the top of a winze; the loaded truck is pulled up and the rope disconnected. The truck is then passed along to the shaft. An empty is brought up and perhaps accidentally pushed over the brow of the winze before the rope is properly attached to the truck, with the result that the truck runs down the winze, and in all probability injuring fatally the workers in the bottom. With the object of preventing this class of accident, Regulation 43 (c) was framed, which reads:—" On every inclined shaft, winze or roadway in which trucks are worked attached to the end of rope a self-acting turn-out switch or other effective contrivance shall be provided and used to prevent the trucks from running away." Such a rig should always be installed at the top of every winze, and in my opinion must be made to work automatically. On angles of low dips, say 20 degrees and under, trucks should be furnished with a drag or trailer, so that in the event of the rope breaking, the truck is brought to a standstill. Finally, the connection between ropes and trucks must be so designed that accidental disconnection be made impossible. The accident rate in winze sinking, due to trucks running away through ropes breaking or any other cause, is high. Accidents from the above cause would entirely cease if manholes were cut in winzes, so that the workers in the bottom could take refuge when the skips or trucks were in motion. To cut such small manholes would yield pay dirt for the mill, and not retard the sinking to a great degree.

(*To be continued.*)

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THE WEEK IN THE SHAREMARKET.

Better with More Business—Broadening Tendency in London—Quieter Towards Week-end.

The market has been distinctly better this week. London appears to be taking an increased interest in our gold shares, and despite all the restrictions on business quite a spurt in the demand was seen. New Modders, Modder B.'s, City Deeps, and Modder Deeps seem to have attracted considerable attention, and the quotations for all these continue to improve. Knight Centrals, however, provided the sensation of the week, on the news of the excellent values of the reef below the dyke. The turn in the prospects of the mine comes at an opportune moment, and it is to be hoped that the position will now steadily improve. Owing to the Jewish holiday to-day, and the mid-week activity, business eased off on Friday.

	Fri., 10th.	Sat., 11th.	Mon., 13th.	Tues., 14th.	Wed., 15th.	Thurs., 16th.
African Farms	7 6†	7 3*	7 3	7 2	7 6	7 3*
Apex Mines	15 9	16 3	16 6	16 6*	17 6	16 9*
Aurora Wests	7 6*	7 6*	7 6*	7 6*	7 6*	7 6*
Bantjes Cons.	—	—	—	—	—	5 9*
Brakpan Mines...	59 6	59 0*	60 0†	60 0†	60 0†	60 0†
Breyten Collieries	20 0*	20 0*	20 0*	20 0*	—	—
Brick and Potteries	5 0*	5 0*	—	—	—	—
British South Africa	—	—	—	10 0*	—	10 3*
Cassel Coals...	18 0	18 0*	19 0	19 6*	19 9	—
Cinderella Cons.	2 9*	—	—	—	—	—
City and Suburbans . .	42 6*	42 0*	42 0*	43 6*	44 6	44 0
City Deeps	61 9*	62 6	62 9*	63 0*	64 3	64 0
Cloverfield Mines	5 3*	5 4	5 4*	5 7*	5 6*	5 4*
Clydesdale Collieries	12 0*	12 0*	12 0*	12 0*	12 0*	12 0*
Cons. Gold Fields	—	24 0†	—	—	24 0†	—
Cons. Langlaagtes...	36 0*	36 3*	36 6*	37 0*	37 6*	37 0*
Cons. Main Reefs	17 6*	17 9*	18 0*	18 3	18 3*	18 0*
Cons. Mines Selection	9 0*	9 3*	9 3*	9 3*	9 3*	9 3*
Coronation Collieries	—	—	26 6*	26 6*	26 6*	—
Crown Mines Debentures...	£98*	—	£98*	£98*	£99*	£99*
East Rand Centrals	3 0	2 11*	2 10*	—	—	3 3†
East Rand Coals	1 10*	1 10*	1 9*	1 10*	1 10*	1 10*
East Rand Deeps	1 2*	1 3*	1 3*	1 3*	—	1 3*
East Rand Minings	5 6*	6 0*	—	—	—	—
East Rand Props.	—	20 6*	20 6*	20 3*	20 3*	21 0
East Rand Debentures ...	£85*	—	£86	£85*	£85 !	£85*
Eastern Gold Mines	1 2*	1 2*	1 2*	1 2*	1 2*	1 2*
Ferreira Deeps	—	—	—	—	40 0	—
Frank Smith Diamonds ...	1 4*	—	1 4*	—	1 4*	1 4*
Geduld Props.	31 6	32 0	32 3*	32 0	32 0*	31 9
Glencairn Main Reefs . .	2 0*	2 0*	2 0*	—	2 0*	2 0*
Government Areas	23 9*	23 9	23 9	23 9	23 9*	23 6
J'burg Board of Executors	21 0†	21 0†	—	—	—	—
Jupiters	5 9†	6 0†	5 9†	5 10	6 0*	6 6*
Kaalfontein Diamonds ...	0 4†	—	—	—	—	—
Klerksdorp Props.	1 6*	—	1 6*	—	—	1 6*
Knight Centrals	7 4	7 9*	8 3	10 11	10 8	10 9*
Lace Props....	3 9†	3 7*	3 7*	3 7*	3 8*	3 7*
Luipaardsvlei Estates... ...	6 9*	—	7 0	7 0*	7 0*	—
Lydenburg Farms... ...	3 5*	3 8*	3 9*	3 9	3 9*	3 10*
Main Reef Wests	6 6*	6 6*	6 6*	7 0†	6 10*	7 0*
Main Reef West Debs. ...	£63*	£65*	£65*	£65*	£65*	£65*
May Consolidated	7 0*	—	—	—	6 6*	6 0*
Meyer and Charltons	—	—	—	100 0*	100 0*	100 0*
Middelvlei Estates.	1 3*	1 2*	1 6†	1 2*	1 2*	1 2*
Modderfontein B.	114 6	115 0	114 6*	115 0*	114 0*	115 0†
Modder Deep Levels	99 0	98 3*	98 0*	98 3*	98 6	97 6*
New Boksburgs	0 10*	0 10*	0 10*	0 10*	0 10*	0 10*
New Eland Diamonds	10 0†	10 0†	10 0†	—	10 0†	10 0†
New Era Cons	6 11	6 9*	6 11	6 9*	6 9*	6 9*
New Geduld Deeps .. .	2 3*	2 4*	2 4*	2 4*	2 4*	2 5*
New Gochs	—	—	—	13 6*	13 6*	13 6*
New Heriots	56 0*	58 0*	57 6*	—	—	—
New Kleinfonteins	22 3*	23 3	23 6*	23 6*	24 3	23 9*
New Modderfonteins	297 6*	298 9*	300 0†	—	300 0*	305 0B
New Rietfonteins	—	1 0†	1 0†	1 0†	1 0†	0 10*
New Unifieds	16 0†	—	17 0†	—	15 6*	15 9*
Orange Diamonds	—	0 3†	0 3†	0 3†	0 3†	—
Pretoria Cements	42 0*	42 0*	42 0*	42 6*	—	43 0*
Princess Estates .	3 6†	3 6†	3 6†	—	—	—
Rand Collieries... .	1 9*	1 9*	1 9*	2 0*	2 0*	—
Rand Klips	4 5	4 3*	4 3*	4 5	4 4*	4 3*
Rand Nucleus	1 8*	1 5*	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps	2 9*	2 9*	2 9*	2 9*	2 9*	2 9*
Randfontein Estates ..	—	13 0*	13 0*	—	13 0*	13 0
Robinson Deeps... ...	—	—	20 6†	—	23 6*	24 0†
Rooiberg Minerals... ..	15 0*	15 0*	16 0*	16 3†	15 6*	—
Roodepoort Uniteds ...	2 0*	—	—	—	2 6*	2 9*
Ryan Nigels	2 6*	2 6*	—	2 6*	2 6*	—
Shebas	—	2 3†	2 3†	—	2 3†	1 9*
Simmer Deeps	1 7*	1 6*	1 6*	1 6*	1 7*	1 7*
S.A. Breweries	31 0*	30 6*	31 0*	30 6*	30 6*	31 0*
S.A. Lands	2 7*	2 7	2 7*	2 7!	2 7*	2 7
Springs Mines	26 3	26 4½	26 3	26 0	26 3	25 6
Sub Nigels	10 0*	10 3*	10 9*	11 3	11 3	11 0
Transvaal Coal Trust ...	38 3*	38 6A	38 9*	—	39 0*	40 0†
Transvaal Lands	11 0*	11 0*	—	—	—	—
Transvaal G.M. Estates ...	30 0	—	31 6†	—	29 0*	30 0†
Van Ryn Deeps	49 6	49 6	50 0*	50 3*	50 0*	50 0
Village Deeps	35 0†	33 0*	—	—	33 0*	35 0†
Vogelstruis Cons. Deeps...	1 0†	0 9†	0 9†	—	0 9†	0 9†
West Rand Cons.	—	—	—	—	—	7 0*
Western Rand Estates ...	—	—	—	1 3†	1 0	0 10*
Witwatersrands	52 6†	53 0†	—	51 0*	51 0*	51 6*
Witwatersrand Deeps... ...	27 0*	27 6*	27 6*	—	27 3*	26 6*
Wolhuters	12 0	11 9*	12 0	11 9*	11 9*	12 0
Zaaiplaats Tins	14 6*	14 6*	14 6*	15 0	16 0	15 6*

A Ex London. B Odd lots. * Buyers. †Sellers.

MINING INSTITUTE.
TEACHING CENTRES:—{ JOHANNESBURG AND SCHOOL OF MINES, KIMBERLEY.

Prof. YATES prepares candidates for the following Government Certificates:—
MINE MANAGER'S. MECHANICAL ENGINEER'S.
MINE OVERSEER'S. ELECTRICAL ENGINEER'S.
MINE SURVEYOR'S
by Class, Private Tuition and Correspondence
SOME 1914 RESULTS:—
MANAGERS - - - January and May . . . ALL Passed.
ELEC. ENGINEERS - February - - - - - 66% ,,
MECH. ENGINEERS - June (Kimberley Centre) - - ALL ,,
MINE OVERSEERS - - - - - Practically ALL ,,
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PERSONAL.

The ordinary general meeting of the Chemical, Metallurgical and Mining Society of South Africa will be held in the Lecture Theatre, South African School of Mines and Technology, Johannesburg, this Saturday, the 18th inst., at 7.45 p.m. General business: "An Improved Method of Removing Broken Ore from Stopes," by Mr. M. Weinbren; discussion on notes previously read. Presidential address, by Mr. Jas. E. Thomas. Papers for reading: (1) "Cyanide Consumption on the Witwatersrand," by Mr. H. A. White; (2) "The Prevention of Hydrolysis in Cyanide Solutions," by Mr. H. M. Leslie. Reply to discussion: "Safety Measures in the Use of Explosives," by Mr. Wm. Cullen. Final discussion: (1) "The Use of Scoop Discharges in Tube Mills," by Mr. W. R. Dowling; (2) "Notes on the Practical Testing of Working Cyanide Solutions," by Mr. Edward H. Croghan. Continued discussion: (1) "Notes on the Treatment of Antimonial Gold Ores from the Murchison (Transvaal) Range," by Mr. H. R. Adam; (2) "Recent Investigations on Dust in Mine Air and the Causation of Miners' Phthisis," by Dr. James Moir.

* * * *

For bravery in saving life in the City Deep Gold Mine, Witwatersrand, on 29th October, 1913, Mr. James Wagenaar has been awarded the Edward Medal of the Second Class. The official announcement of the award is accompanied by the following account of the recipient's bravery:—Wagenaar was working in the mine when he was informed by a native that five other natives down a winze, or steep incline, had been overcome by the fumes from explosives used in blasting (the debris brought down had interfered with the ventilation and prevented the dispersion of the gas). Wagenaar, tying a wet cloth round his mouth, immediately descended the winze to the place where the natives were lying in various stages of collapse, and, without assistance, brought out four of them in succession. He proceeded down the winze for the fifth time to bring out the last native, but was unable to carry him up more than a few yards, as he was fast being overcome by the fumes, and had himself to be helped out of the winze. Three men, who subsequently brought out the fifth native, also collapsed from the effects of the gas. It is probable that but for Wagenaar's brave action all the natives would have succumbed to the effects of the fumes. Wagenaar and the five natives were all in hospital for some days.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

American Ships Coming More Regularly—Trend of Prices Easier—Rubber Flex Unobtainable—Prices of Steel Rails.

Mining material business still continues very dull indeed. The uppermost conversation usually turns upon war topics, and the absence of orders gives the loquacious individual the opportunity of airing his own particular views. However, one reason for the dullness is generally admitted to be that the British Navy has the upper hand of the enemy's submarines, thus allowing fairly safe navigation for goods coming to this country. Another reason is that a series of American ships have been arranged to sail direct for the Cape, and anticipations have been formed that we shall get pretty regular weekly, and at the most fortnightly, arrivals from New York at the Cape. This will relieve the shortage of American mining and electrical goods, which have become quite an important factor for the Witwatersrand gold fields. For example, we have been "living" upon American steel plates for a long while, and now they have overlapped the British and Continental variety. Although business is on the lean side the feeling is more cheerful, especially when it was reported that the Knight Central mine had experienced a rich strike on Wednesday last, when the shares appreciated about half-a-crown. Another reason for congratulation amongst mining men in Johannesburg is that the sharemarket keeps marvellously firm, and in special lines quite buoyant, which many people cannot fathom; however, be that as it may, it puts quite a lot of life and optimistic feeling throughout commercial circles, when the sharemarket is on the firm and active side.

Oils, Lead, Turps, Paints, etc.

According to the information obtained from the manager of a leading house, it was ascertained that business with his firm is better, and at times more buoyant than it has been certainly since the war commenced, and a long time before. There is quite a dearth of steel ceiling men, as well as the best painters, which is explained by many men having to leave here two years ago through the lack of work, and others have joined the forces. The following comments have the sanction of an expert in the trade:—Turpentine, now that America has arranged a series of ships for the Cape, in price will not alter much—perhaps if anything may become easier. White lead: As the British Government is using such quantities of raw pig lead, the present price will hold firm for some time. Linseed oil is always a gamble, as the supplies are pretty well controlled by strong financiers, and it is not expected that the price will fall below 20s. for a long while. Distempers have advanced: Kalvomine, 4s. 7 lbs.; Muralo, 17s. 6d. 56 lbs.; Hall's, 4s. 6d. 7 lbs.; Calcite, 19s. 6d. 56 lb. case. Most of the deep reds and greens are unprocurable owing to the scarcity of chemicals in England. Roof paint up 1s. per gall., say 40s. for 5 galls. Paints in oils: Blues, deep greens, yellows and reds are advancing rapidly in England, but locally still much the same owing to the heavy accumulated pre-war stocks. Sundries: Putty, red oxide and ripolin have all advanced slightly. Quotations for putty, 23s. 6d. per 100 lbs.; red oxide, 26s.; and ripolin, 26s. per gall. Sheet glass prices still rule very high in England with seemingly no hope of reaction. A lot of American sheets are to hand, but on the whole the quality is far from satisfactory. The prices are considerably under the English make. Steel ceilings are much the same in price, but the selection is not so extensive. Ladders and steps are about the same, excepting for the longer length ladders—there is a nice lot of locally made ladders in the market which keeps the price at normal, although timber is dearer. Brushware has advanced quite 20 per cent. since the war, with possibly higher prices in future. Bristles are getting scarcer and scarcer in Britain, and it will be some time before brushes will be at their old price again.

Timber, Steel, Iron, etc.

There is no quotable change in prices, but since it has been reported that American shipping will visit our ports more regularly the tendency of values appears rather on the easier grade, especially for anything like large contracts extending over a period. The check in the importation of made doors, window frames, etc., has given a decided fillip to the local manufactories who are turning out all the stock sizes for buildings, which are readily absorbed, as the prices are only a little above the imported articles, which are not always available through the irregularity of shipping transport.

Electrical Material.

Double pure rubber flex is unobtainable, in wholesale quantities, and as much as 1s. per yard, double the recognised price, had to be paid to finish contracts. A short time since there were fairly good stocks in Johannesburg, but the coast towns and Rhodesia came on with orders, and with our own consumption, denuded the place of stocks. Now we are endeavouring to buy from the coast with very little result up to the present. There are several decent consignments on the Clan McDougal, but that is not expected for about ten days or more. The electrical business throughout the town and in the suburbs is quite good and general stocks are fair, and absolute shortage of any lines is now the exception and not the rule. The British makers have got out of the muddle and seem getting into their stride again, as goods are coming forward pretty well, and what is an excellent indication is that orders are being completed more in the order of rotation and not that haphazard style as formerly. As a proof of this, ceiling roses have been up to 7s. 6d. here, but now 4s. 6d. Lampholders were 12s. dozen, now 8s. These self-same lampholders, before the war, were 30s. 6d. per gross from the Continent and 33s. 3d. British. The engineer who gave these figures states that they may never see the pre-war rates again, of under 3d. each. Each one is made of ten pieces; each piece being of exquisite workmanship, obviously turned and fashioned by elaborate machinery, and fitted together by hand. It may well be likened to the up-to-date machinery which can turn out a decent watch for 5s.

Second-hand Materials.

Trade is not at all bad, as the outside enquiries are increasing. There has been business done in small suction gas plants and oil engines for the Northern Transvaal and Southern Rhodesia. In addition, there are enquiries for extra small batteries for prospecting parties. As regards machinery and battery spares the producing mines have secured all those which recently came from the Western Rand, which has eased the position for new goods. It was expected that the farmers would soon be coming into the second-hand material market again, since the Government arranged for three ships, as a prelude for a greater number, to take mealies oversea, and now it happens that in a day or so after such good news, the London market dropped the price 2s., hence we are just where we were.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in., 6d. per lb.; ½ in. up to 2 in., 37s. 6d.; 6 in., 35s.; over 6 in., 32s. 6d.; ⅝ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 30s.; over, 29s.; ⅞ in. and 1 in., 29s., all per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 40s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails,

£14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 35s. to 47s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d. and 5s. 6d., 30 in., 12s. 6d., 36 in., 15s. 6d., 42 in., 18s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6ft. to 10ft., 8d. to 8½d., 11ft. 8¼d.; 12ft. 8¾d.; 26 gauge, 6 ft. to 8ft. 6d., 9ft. 6¼d., 10ft. 6½d.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 30s. to 35s. per 100 lbs.; solder, 50 per cent., 1s. 3d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9¾d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 3s. 9d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.

Bricks, cement, lime, etc.: Cement, imported, 32s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 20s. 6d. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 42s. 6d. 2/5 galls.; coal tar, imported, 8s. 6d. to 9s. 6d. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 22s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 11s. 11d. 2/5; petrol, 22s. 2/5; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £18 per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 4s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 3d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; radiator lamps, 4s. 6d. each; double pure rubber flex, 6d. per yd.; 3/20 coils of wire, 25s.; do., 3/22, 20s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 10s. doz.; switches, 5 amp., 10s. to 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. to 15s. 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

The Week's Meetings.

SWAZILAND TIN, LTD.

Annual Meeting.

The tenth ordinary meeting of the shareholders of Swaziland Tin, Ltd., was held on September 10 in the board-room, Corner House. Mr. M. Honnet presided, and there were also present Messrs. C. Meintjes, C. Distel, A. C. Smith, G. H. Darby, H. J. McCormick, S. W. George, C. J. O'Rorke, F. H. Barry, and A. G. Gill, with Mr. J. Jervis Garrard, consulting engineer, and Mr. L. G. Heard and Mr. C. L. Read in attendance. There were 55,257 shares represented out of an issue of 84,000.

The Chairman's Speech.

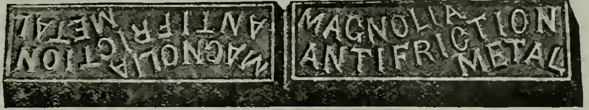
The Chairman, in moving the adoption of the report and accounts, said: Your Chairman, Mr. H. C. Boyd, is unfortunately unable to be present here to-day, owing to illness, from which I feel sure you will join me in wishing him a speedy recovery. In his absence I have pleasure in moving the adoption of the directors' report, balance sheet and accounts for the year ended 30th June, 1915, and in doing so I shall, with your permission, refer briefly to a few points in connection with the past year's operations. As the metal price realised for our product during the 12 months ended 30th June, with which the report and accounts before you deal, was virtually the same as that for the preceding 12 months, the improvement by over £6,000 in the working profit is entirely due to the increased recovery of concentrate and reduction in expenditure. Over 960,000 cubic yards of ground were treated, an increase of some 240,000 yards, at a cost of £2,343 less than for the previous year. The total expenditure per yard was reduced by almost a third, to about 6½d. While doubtless we are reaping the benefit of the improved lay out and efficiency of the plant installed, credit must also be given to the management for this marked change for the better. Full details of the year's work are given in the reports of the consulting engineer and the manager: they contain figures of considerable technical interest, to which I would refer you. The yield in tin per cubic yard treated showed a slight decrease, due partly to appreciable loss of concentrate during the floods of December and January (in regard to this a claim has been lodged under our insurance policy) and partly to the treatment of poorer ground, not included in the estimated payable ground, adjoining the proved ground and sufficiently profitable to be taken in the ordinary course of working.

Drilling and Profits.

Generally speaking, the values disclosed by drilling have been amply confirmed except in the case of two places where the existence of large boulders has led us to reduce our average estimated value. We are continuing to test by drilling the ground at certain of the working places in order that we may have an idea of what is ahead of us, and I would call your attention to the figures regarding these particular deposits in the consulting engineer's report, which discloses a highly satisfactory position. Except in the case of King's Flat, a great deal of ground remains to be tested at these places. Most of the drilling last year was for the testing more thoroughly of previously partially drilled ground, in addition to the operations recorded at Mbabane Flats. Results elsewhere are not sufficiently advanced for us to submit definite estimates. There is, of course, an immense amount of probable tin-bearing ground on our large property which we have not yet been able to examine, far less test. It is to be noted that we do not attempt to drill in what we term the hill creeks, our experience in working these being sufficient to guide us as to where operations should be carried on. You will see that the manager's report indicates that during the current year more ground should be treated, as fresh working places will be started, while the ground immediately ahead of us in the drilled deposits is apparently richer than that dealt with last year. The net profit for the past year was £12,834, from which a dividend of £6,150 was paid, the unappropriated balance carried forward being increased to £12,639, represented by cash and cash assets, less liabilities. While, owing to the difficulty of disposing of our product during the first half of the year, a dividend could not then be declared, the distribution for the second half might clearly have been larger, but we have decided, and I am sure that shareholders will approve of this course, only to pay out actual cash available for distribution, and not, as formerly, to borrow against tin in transit. All the tin produced during the period has now been sold, the last shipments realising somewhat better prices than those for which credit was taken in the accounts before you. In arriving at the net profit, £1,125 were written off as our share of the expenditure during the year on the Zaaiplaats' lease. We hope shortly to get a return of an appreciable portion of this sum as ore from the lease has been for the past two months and is still in course of treatment at Groenfontein Battery. Payable ore continues to be developed, and the prospects may be said to be favourable. In conclusion, I would like to record the board's appreciation of the services rendered during the period under review by Mr. J. J. Garrard, our consulting engineer, Mr. T. Kelly, our manager, and by the other officials of the company.

The report and accounts were adopted.

The retiring directors, Messrs. H. C. Boyd and F. Oats, were re-elected, and the auditors, Messrs. Alex. Aiken and Carter, were reappointed.



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Engineering Notes and News.

MINING CONDITIONS ON THE RAND.—II.

By W. L. HONNOLD.*

BRAKPAN MINES, LTD.

The reef characteristics and significant bearing of this mine have already been mentioned. When first considered its remoteness from known conditions rendered it a speculative venture and, even when 188,000 dollars had been expended on boreholes and other preliminaries, the outcome was problematical. Thereafter a further expenditure of 5,772,000 dollars, distributed over eight and a half years, with consequent deferment of interest, was called for before the commencement of milling. Perhaps no more notable instance of the confidence which the Rand has inspired is available, and, in the light of tendencies elsewhere disclosed, it is doubtful if there has been an issue of more vital importance to the industry. The dimensions of the property are about 6,000 by 14,000 feet, and the shafts are located as symmetrically as considerations of depth and ventilation would allow. The south (No. 2) shaft is centrally situated and it is to the dip of the north or upcast shaft. This disposition is favourable to rapid development, ventilation, pumping and underground work generally. Each shaft has seven compartments and measures 42 by 9 feet over all, the large dimensions being due to ventilation rather than to hoisting considerations. In the north shaft the reef was reached at a vertical depth of 3,098 feet, and in the south shaft at 3,707 feet, both being continued to provide for bin and loading facilities, as well as tail-rope sheaves. Full particulars of the shafts and of the methods adopted in sinking, also cost details, were given in a lecture delivered by Charles B. Brodigan at the Royal School of Mines, London, on January 27, 1913, and published by the *Mining and Scientific Press*, under the title "Rand Practice in Deep Shaft Sinking" (April 26 and May 3, 1913). Both shafts are provided with steel headgears 105 feet high, the combined bin capacity of the latter being about 3,700 tons. The ore is transported by means of a locomotive in 40-ton railway trucks from the north to the south shaft, a distance of 4,300 feet, where it is discharged on to belts which deliver it to the sorting and crushing plant. The connecting railway, which is of standard gauge, extends to the shops, stores, etc., and also to the main line. Hoisting equipment is installed for only two compartments of the north shaft. The drums, measuring 11 feet diameter by 8 feet face, are directly driven by a 1,450 h.p. motor with Ward-Leonard control, 2,100 h.p. being absorbed in starting. Main and tail ropes are of 1½ inch. diameter and the skips carry a net load of five tons. The south shaft has four compartments equipped for hoisting. Two are served by a Ward-Leonard set identical with that at the north shaft, and are used solely for the handling of men, tools and supplies. The cages have three decks and accommodate 60 men each, about two hours being required for lowering or hoisting the day shift of about 110 white and 1,650 native employees. The other two compartments are practically restricted to the handling of ore. Load, ropes and drums are unaltered, the drums in this case, however, being directly driven by a three-phase 2,100 volt motor of 1,450 h.p., using the standard type of liquid controller. Post brakes operated by deadweight and relieved by air pressure are provided in each instance, together with devices for the automatic prevention of overwinding and tooth clutches for adjustment. About 150 tons per hour are handled over a vertical distance of 3,850 feet, and the cost per ton, as in the case of the Ward-Leonard at the north shaft, averages 17 cents when hoisting a total of about 64,000 tons per month. Regarding the station at the bottom of the south shaft, it will be noticed that after the trucks are knocked off the various haulages they pass in one direction over the bins, where they are emptied by means of hand-operated revolving tipples. The grade of the station roadways is 1 in 60 and of the curves 1 in 50, the trucks travelling with but slight assistance. The bins, which discharge into Kimberley loading chutes, do not call for description. Nor is it necessary to refer to the arrangements at the bottom of the north shaft, except to mention that an 84 inch Sirocco fan is installed, together with doors and other requirements of ventilation.

DEVELOPMENT.

The average dip of the section between the shafts is 7 degrees, its length is 4,500 feet, and the width about 18 feet. This section was driven from both ends and was connected at a point 3.173 feet from the north shaft, the horizontal error being 6·5 in. and the vertical 0·7 in. Almost throughout, the reef was above the incline, but never more than 40 feet. Stations were cut at intervals of 500 feet down to the 7th level; below that point, owing to the flatter dip, they were spaced about 800 feet apart. It will be recognised that in the development of flat-reef mines such as Brakpan certain features assume a more serious aspect than where the dip is steeper. For instance, the accentuated influences of minor undulations and dislocations of reef render it difficult to avoid excessive sinuosity in driving, which not only adds considerably to development costs by reducing the effectiveness of footage, but also interferes with efficient tramming later on. And, obviously, comparatively small faults exert an exaggerated bearing on the length of crosscuts. To meet obstacles of this nature straight-line

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* Paper read before San Francisco Meeting of A.I.M.E., September, 1915.

work is often resorted to, although even this is not free from difficulty if the reef is so disturbed as to require frequent changes in the grade, for the removal of broken ground then becomes more laborious, winches having to be placed at the high points, and the handling of water is complicated by the need of pumps at the low points. The latter handicaps, of course, may also be encountered in pilot drives and haulage-ways, but as to these there is no alternative, since their expeditious advancement, as previously pointed out, is a matter of vital importance in such a mine. It should perhaps be added that the bad features referred to largely disappear when the roadways are finally completed and equipped. The details of development work do not differ materially from common practice. Headings are driven on reef where conditions permit, faults and undulations, however, calling for many departures from the rule. Levels are about 6 by 7 feet; winzes are carried 9 feet wide in order to expedite the opening of stopes; main haulage-ways are 14 feet wide, and those of secondary importance 11 feet. Large machine drills are used, mostly of the reciprocating type, with $3\frac{1}{4}$ inch cylinders. These, however, are gradually being replaced by large hammer-type machines using hollow steel, through which water is fed to the bottom of the hole. A high-power explosive is called for, and it is found that blasting gelatine, containing 92 per cent. nitro-glycerine, gives the best result. Up to the end of 1914 the practice in single-width headings was to blast the cut first, then to turn on a water spray close to the face for about 30 minutes to eliminate dust and fumes, and finally to blast the round, all in the same shift and as soon as possible without undue risk to health. In the wider headings, cut and round were blasted simultaneously. Recently the Government Regulations were so amended as to make it illegal to blast the cut and round separately in the same shift except under special conditions and precautions against dust and fumes approved of by an inspector of mines. Consequently, as far as possible, two single-width headings are now assigned to each miner and the cut and round are blasted on alternate shifts The full effect of this procedure on costs and the rate of progress is not yet clear. Drives are equipped with single track 20lb. rails laid to 24in. gauge, and haulage-ways with double track of 30lb. rails, as well as the necessary endless-rope fittings. Both are electrically lighted and provided with air and water pipes of ample size. The cost of development during 1914, exclusive of shovelling, tramming, winding and pumping, but inclusive of equipment, amounted to 15·87 dollars per foot for drives, crosscuts, raises and winzes, and 25·60 dollars per foot for haulage-ways.

STOPING.

Whether hand or machine stoping, or a combination of both, should be adopted in flat-lying mines is a question on which opinions may differ. It is not entirely a matter of natural conditions, since certain associated factors have to be taken into account. In favour of machine stoping it may be urged (1) that the generally existent shortage of native labour calls for the adoption of mechanical means as far as possible; (2) that hand-stoping natives show less efficiency in such a mine as Brakpan because of their aversion to the "uppers" or dry holes frequently required near the roof; (3) that in most stopes the reef is of fairly good thickness and its value therefore does not suffer excessively through the increased stope width inevitable with machine mining; (4) that the cost of machine mining is lower, particularly in the wider stopes referred to; and (5) that it will probably enable the supply of a larger average tonnage to the mill. Advocates of hand stoping may claim (1) that the system requires smaller capital expenditure; (2) that a somewhat narrower stoping width is obtained; and (3) that there is less shock to the roof and consequently less demand for support. Where both methods are in use it is, of course, possible to vary their proportionate employment accordisg to the ebb and flow of native labour and thereby to render the output somewhat less fluctuating. At Brakpan the unusual course of all-machine mining was decided upon and an equipment of 375 drills capacity is now installed. That the decision was warranted is shown by the fact that the mine has seldom had its full quota of native labour, notwithstanding that the total number of machines on the Rand has since increased by more than 50 per cent. Operations are more sensitive to labour fluctuations than in mines that are partly hand stoped, but this is a matter of secondary importance and, in some measure, is regulated by increasing or decreasing the accumulation of broken ore in the stopes. Reciprocating machines of $2\frac{3}{4}$in. and $3\frac{1}{4}$in. cylinder diameter are now mainly used in stoping, the smaller size being restricted to stopes under 60 inches and accounting for about 22 per cent. of the tonnage broken. Small drills of the hammer type with automatic feed and hollow steel are, however, being tried with marked success, and promise in time to replace the reciprocating machines throughout. Two natives are attached to each machine —a hammer boy and a spanner boy—and there is a native drill carrier for every two machines. They work under the supervision of a white miner, who is on contract, and who, as a rule, has charge of four machines irrespective of size. Large machines show an average efficiency of 0·62 square fathom, equivalent to 11 tons, broken per machine shift, and small ones 0·49 square fathom, or 7 tons, the average stope widths being 70 inches and 57 Inches respectively. The poor showing, as compared with that obtained elsewhere, is due to labour conventions, white and native, which restrict the daily task per machine, whether large or small, to approximately four holes of 6 feet depth. The higher efficiency of the large machines may therefore be taken as a measure of the more favourable breaking conditions in the wider stopes. About 57 per cent. of the explosive used in stoping is blastisg gelatine, containing 92 per cent. nitro-glycerine, the remainder being gelignite, containing 60 per cent. nitro-glycerine. Generally the stronger explosive is used in the narrower stopes and the weaker in the wider ones; individual stopes, however, may call for a reversal of the rule.

(To be continued.)

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S.A.
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1915.

BY S. R. POTTER.

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CONTENTS.

PAGE
Notes and News ... 73

Topics of the Week:

The Economics of Cyanide Consumption ... 75
Problems of the Outer Rand ... 76
The War and Rand Metallurgy ... 76
The Upper Witwatersrand System ... 77
Mining Conditions on the Rand—III. ... 78
Large Copper Mine, Tsumeb, G.S.W.A. ... 79
The Year with the Simmer and Jack ... 80
Stoping Methods and Drilling Problems on the Witwatersrand ... 81
Transvaal Chamber of Mines' Quarterly Review ... 82
Correspondence and Discussion: "Chemists for Munitions Work"; "Dr. Mellor's Rand Geology"; "Phthisis Money and How it Goes!"; "A Plea for the Geological Museum" ... 83

Rhodesian Section:

Latest Mining News ... 84
The Week in the Sharemarket ... 85
Personal ... 85

Mine Safety, Sanitation, and Welfare Bulletin:

Miscellaneous Mine Accidents—III. ... 87
The Water Supply of the Rand—VIII. ... 88
The Week in the Mining Material and Engineering Trades ... 89
Engineering Notes and News ... 93
Machinery Accidents on Rand Gold Mines ... 93
The Week's Meetings: T.G.M.E. ... i.

Notes and News.

The Geological Museum. A correspondent in this issue writes to the effect that the Geological Museum in the University College Buildings is to be closed for want of funds. The collection is the property of the Geological Society of South Africa, and for many years past has been thrown open free of charge to those whose occupation or taste led them to its doors. A curator, who has earned a wide and well-deserved reputation for his skill in petrological work, and a native attendant, comprise the whole staff of an institution which exists solely for the furtherance of scientific knowledge, and is the only one of its kind in the centre of the richest mining district in the world. In Pretoria, a geological museum, abundantly enriched with mineral and rock specimens, is maintained by the Government for the benefit of the Mines Department and a few casual visitors. It is of comparatively little use to the mining population, for whose advantage it ostensibly exists. Private zeal and enterprise has endeavoured to save the reputation of Johannesburg in this matter of scientific endowment, and has been seconded generously by the Municipality, who can only be said to be somewhat very remotely interested in the facilities afforded by a geological museum, and for some time past the meagre salary of the curator and the wages of his native attendant have been provided by them. The University claims to have a sufficient local collection of its own, and the Department of Education doubtless considers itself, therefore, to be under no obligation to subscribe towards an institution which is doubtless used to a liberal extent by its students. The Municipality, from motives of economy, are said to find themselves unable to continue their support, and there is a probability, as we have said, that a meritorious and useful undertaking which has struggled along bravely for many years, is about to collapse. If it does its failure will leave a lasting stain upon the name of those whose business it is, and whose pride it should be, not only to maintain it, but to make it one of the best of its kind in the world.

* * * *

Stock Exchange Values. The usual compilation of Stock Exchange values appearing in the *Bankers' Magazine* shows that in the past month there has been a shrinkage of 0·09 per cent. in the aggregate value of the 387 representative securities included in the table. The majority of sections show declines, but two notable exceptions which have served to largely offset the falls have been provided by Colonial Rails and American Rails, the former recording an advance of no less than 5·2 per cent. and the latter of 4½ per cent. American Gold bonds have also improved, and show an advance of 1·1 per cent., and Shipping shares have risen 1·8 per cent. The groups which exhibit the principal declines are Home Railway Ordinary stocks, which have dropped 3·1 per cent., and Bank shares, Breweries, Gas stocks, Telegraphs and Telephones, Commercial and Industrial shares and Mining issues. British Government and Corporation stocks and Colonial Government issues are, of course, protected by the minimum prices, and in the aggregate, therefore, do not show much alteration.

* * * *

South African Trade: Important Official Announcement. The following is issued by the Board of Trade: "The office of H.M. Trade Commissioner in South Africa suggests that manufacturers and others in the United Kingdom who may be contemplating the opening up, or extension, of trade in the South African market would be well advised not to defer taking the necessary steps to that end until the conclusion of the war. On the contrary, it is suggested that the time to organise their South African trade is now, so that immediate advantage may be taken of the opening that will exist so soon as the difficulties created by the war disappear. Their competitors are making strenuous efforts, and not merely with respect to the capture of German trade, and it is desirable that British firms should not lose the time that could be employed in profitable trading during the first months of peace by having to complete agency and other arrangements."

* * * *

A Question of Quality.

Exception has been taken to a remark on page 69 of our last issue, which read, "A lot of American iron sheets are to hand, but the quality is far from satisfactory. Our informant, it appears, was misinformed. The assertion in question is disproved by the fact that some of the most important firms in South Africa have had several shipments of American sheets, and the fact that repeat orders have been obtained is a sufficient indication of the good quality. That some criticism will be made in the case of American sheets is admissible, but it is pointed out to us that every brand on the market (whether British or American) fails to satisfy all purchasers—due to some extent to the fact that some refuse to regard any but their pet brand as being good, despite the fact that other sheets may be quite equal in quality.

* * * *

Anglo-French Exploration.

The scheme for the cancellation of the preference capital, which was adopted in London last week, is not new. It was fully explained at the annual meeting held on April 28 last, and apparently has undergone no modification. Holders of the preference shares have always regarded them as a sound investment, and though under the new arrangement they may not relish a reduction in the rate of interest from 6 per cent. to 1½ per cent., yet their security is as good, while, in addition, they have returned to them 40 per cent. of the amount in cash, which can be utilised at present doubtless to advantage. The position of the company as a whole is improved by the scheme. The amount required for fixed interest will be less, thus benefiting the ordinary shareholders. The last named will hardly find fault at the creation of debentures instead of preference shares, seeing that the latter ranked for 20s. in the event of a winding up.

* * * *

"History of the Diamond Fields."

Mr. S. W. J. Harsant, Hon. Sec. D.F. Pioneers' Association, writes to the papers as follows:—"It will be remembered by many of your readers that an announcement of the early publication of the Pioneers' Association's *History of the Diamond Fields* was made in the Press towards the end of June of last year. All the necessary arrangements had been concluded with the London publishers for the issue of the work in the course of a very few months, and it was then fondly hoped that one of the principal objects of the Association had been practically achieved, and that nothing more remained but to see the book through the printers' hands. No sooner, however, was the material transferred to London than war was declared, and it was naturally deemed prudent to at once temporarily suspend the order for printing. A full year has now gone by, and the titanic struggle in Europe has not yet entered upon its decisive stage. It will, therefore, be obvious to everyone interested in the venture that to proceed with the production of a valuable local history of this kind during the present conflict, or even during the 'aftermath' period to follow, would involve serious financial disabilities. On a careful reconsideration of the position, and after weighing the advice of old friends like Mr. Sidney Mendelssohn and others, the committee have come to the conclusion that the wisest course to follow, and one which should ensure for the publication the unqualified success it deserves, would be to await a more opportune season for going to press, and to adopt the suggestion to make its appearance coincide with the forthcoming celebration of the jubilee of the Diamond Mines, now not very far distant. By that time it is sincerely trusted that the effects of the present great upheaval will have passed away, and the Fields will have settled down to a longer and happier age of prosperity and peace."

* * * *

Far East Rand Gold Production.

We referred recently to the individual increases arranged for or probable in the near future by the mines of the Far East Rand. Nine companies were operating in the last completed year at the rate of 3,361,000 tons a year. The present rate of ore consumption is raised to 4,730,000, and by the end of 1916 the rate of output is likely to be raised to a total of about 6,750,000 tons a year. The figures are of such importance that we set them out in detail both as to past, present, and future tonnages annually.

	Output, 1914. Tons.	Profit per ton.	Present rate of output. Tons.	Profit per ton, July, 1915.
New Kleinfontein ..	601,000	8s. 9d.	630,000	8s. 7d.
Probable addition of Benoni mill capacity of 360,000 tons by end of 1916.				
Van Ryn	462,000	10s. 10d.	450,000	8s. 7d.
Van Ryn Deep	483,000	17s. 0d.	500,000	19s. 10d.
Brakpan Mines	621,000	9s. 1d.	760,000	10s. 0d.
Till this year erected plant has not been worked to full capacity.				
New Modderfontein..	510,000	21s. 8d.	630,000	22s. 7d.
Additional plant ordered to be erected at central shaft, of capacity equal to extra 480,000 tons a year; expected to be started about the middle of 1916.				
Modderfontein B. ...	440,000	20s. 4d.	500,000	24s. 3d.
Increase from now on to total rate of 540,000 tons a year.				
Modder Deep Levels.—Started December			410,000	20s. 3d.
Additional plant to raise total to 480,000 tons a year expected to be ready by middle of 1916.				
Government Areas.—Started Oct.		5s. 0d.	540,000	7s. 8d.
In April, 1915, it was decided to double the plant, and by the autumn of 1916 the rate of output may be increased to about the total rate of 1.100,000 a year.				
Geduld Proprietary ...	244,000	7s. 4d.	310,000	9s. 8d.
An early decision to appreciably increase plant is probable.				

Another company is making preparations for reaching the stage of production, namely, the Springs Mines, Ltd., which is erecting plant of a capacity to deal with 360,000 tons a year. This plant is expected to be ready for starting by the last quarter of 1916. The Daggafontein mine, at which operations for the time being are suspended, is endeavouring to make arrangements whereby the mine may be brought to the producing stage.

* * * *

In the Belgian Congo.

H.M. Vice-Consul at Katanga (Mr. F. W. Manners), in his report on the trade of that district in 1914, says:—The railway north from Kambove to Bukama has been actively continued during the year. The total distance by the route now adopted is two hundred and four miles. By December 31st, rails were laid for sixty-three miles, and at the time of writing (March) eighty-six miles were finished. The permanent way is completed over ninety-six miles. The railway has now reached the high Biano plateau, which is free from the tsetse fly, making it possible to land breeding stock there by rail. The headquarters for construction operations has now been moved from Kambove to sixty-six miles beyond, and this section of the road is now being used for regular transport of passengers and merchandise. It is at present impossible to say when the railway will reach Bukama, as on account of the war the construction has been very largely curtailed. Kambove is connected by rail with South Africa via Elizabethville, and when the line reaches Bukama there will be complete connection between South Africa and Boma by rail and water. The railway under construction between Kabalo, on the Laulaba River, and Lukuga, on Lake Tanganyika, a distance of about 250 miles, is now practically completed, but has not been pushed quite to the shore of the lake. A road has been made branching from mile 60 on the Elizabethville-Kasenga road towards the

Kundelungu plateau. This road is finished as far as the Lusipuka River, a distance of 40 miles. The Elizabethville-Kasenga road has been continued to mile 73, and is now being actively pushed forward. An alternative road has been built between Elizabethville and the Star of the Congo. All this road work has been carried out by the Public Works Department.

* * * *

Mine Models. Mine models made from transparent celluloid have, it has recently been demonstrated, many advantages over other types for showing levels, vertical sections, drill holes in any position, or any combination of them. In fact, all available information can be brought together in such a model and placed in its proper position for correlation. It is better than those made of glass, for it requires no framework to support it, neither is it breakable. It is easy to construct, can be made accurate in detail and can be easily taken apart for posting or filing. By the use of mine models it is easy to explain geological and other intricacies to a laymen, a task which is difficult when only cross sections and plans are utilised. A number of the old type of glass models is to be seen in the City of London, says the *Financial Times*, but they are, of course, very unwieldy if they deal with a property of any great depth. A particularly fine one of the Globe and Phoenix mine and neighbouring claims has been made for the Amalgamated Properties of Rhodesia for use in the Court in its pending case against the company owning the property named.

* * * *

Absorption of Gold by the United States. It is probable that more than a quarter of the world's gold production finds a permanent home in the United States, remark Messrs. Samuel Montagu & Co. in their weekly circular. During the past eighteen years there has been an excess of imports over exports averaging £2,500,000 per annum. During the same period the total production of gold from mines in the territory of the United States of America amounted to £319,000,000, or an average of £17,500,000 per annum. It will thus be seen that the absorption of gold based on these data has averaged recently £20,000,000 per annum. The total is probably larger than this, because quantities of ore and silver metal, carrying gold, are imported from other parts of America and the contents are separated within the United States. On the other hand, the considerable amount of gold carried abroad on the person of United States visitors to Europe and elsewhere is a partial set off. The Controller of the Indian Currency reports that after the outbreak of war an arrangement was made whereby the Government of India agreed to receive on behalf of the Bank of England gold produced by certain Indian gold mining companies for safe custody at the Bombay Mint after being melted and assayed. The amount deposited by the end of March, 1915, was 345,980 standard ounces.

* * * *

Officials' Certificates. Those who remember how, at the School of Mines, Professor Yates' audiences filled the lecture theatre to overflowing are not surprised at the marked success of his special classes for mine officials. The classes for all the different Government certificates of competency are not only maintaining their number but are increasing in a most gratifying manner, and the certificates being secured reflect great credit on both Professor and candidates. We, however, would like still greater numbers to attend such classes, for too many of our excellent mining officials unfortunately jeopardise their prospects in their profession by not having the necessary proof of competency. So we again advise them, both in their own interests and that of the industry, to obtain their certificates.

TOPICS OF THE WEEK.

THE ECONOMICS OF CYANIDE CONSUMPTION.

Two notable contributions to the economics of cyanide consumption on the Rand were presented at the last meeting of the Chemical, Metallurgical and Mining Society. In one, Mr. H. A. White pointed out that the annual report of the Chamber of Mines for 1914 gave figures for the purchase of cyanide and total tons of ore milled, and, assuming no great increase in the stocks on hand, it might be calculated that the average consumption of cyanide was 0·40 lb. per ton of ore treated, while zinc figured at 0·32 lb. As the annual requirement of sodium cyanide was, therefore, roughly 5,000 tons, costing at present prices well over a million sterling, it was of great importance to ascertain exactly where all this went and what were the possibilities of effecting any significant saving. With the latter object in view the buying committee of the Chamber of Mines recently called together the consulting metallurgists of the Rand, who, however, agreed that no application of known methods could be relied upon to materially reduce the cyanide consumption in an economic manner. The results of special efforts made when the onset of the war threatened supplies, showed a loss of gold more than counterbalancing any saving of cyanide. As, however, no published data were available giving details of the exact incidence of the known sources of loss a sum of money was voted to enable experiments to be made with this object in view under the control of a sub-committee consisting of Messrs. W. A. Caldecott, K. L. Graham, E. H. Johnson, and H. A. White. By the courtesy of the committee the results of all the experiments specially made and previously unpublished work in this direction were available for inclusion in Mr. White's paper, and it was hoped that a full discussion of the matter would be of some benefit to the industry. The bulk of the experiments were made in the Goldfields Laboratory by Mr. C. A. Meiklejohn, to whom, says Mr. White, thanks are due for the careful and accurate work done; but the full responsibility for deductions made and opinions expressed is assumed by Mr. White. In the second paper, dealing with "The Prevention of Hydrolysis in Cyanide Solutions," Mr. H. M. Leslie holds out a promise of more definite results to be achieved by the introduction of a "Closed system" of cyanide treatment. He shows that a very great loss of cyanide must occur in actual practice where no precautions are taken to safeguard the evaporation of HCy, and that the covering of the vessels shows that protection can be afforded by means of what he calls the "Closed" system. This point was very thoroughly investigated in the laboratory on samples of ore from different parts of the world, and the laboratory work was further checked by working tests in a model plant on lots varying from 100 lbs. to 1½ tons. Under every circumstance this loss by hydrolysis was confirmed, and it was clearly proved that it could be prevented by the "Closed" system so far as these tests went. "These tests," adds the author, "although conclusive to me, knowing how they were conducted, I recognise would not serve to convince others, as the proof of such a theory must be made under actual working conditions, and in a locality where the cyanide process is in active operations. As there is no place in the world where the cyanide process is used to such an extent as the Witwatersrand, I will pass on to the work which has been done here. Early facilities were kindly given by the Rand Mines, Ltd., for this work to be carried out, and at the Village Deep mine a start was made. The proposition was, first, to prove that there really was a loss of cyanide going on which could be prevented by the "Closed" system, and second, if so, was it sufficient to justify any modification in the plant." Briefly stated, his conclusions admit of an affirmative reply in both cases, and Mr. Leslie brings forward a vast amount of data in support of his contentions. To quote his own words:—"The results I think more than warrant the necessity for a remedy such as the 'Closed' system being applied. The extent of this loss to the gold mining industry, where the cyanide process is in use, cannot be accurately determined, but its magnitude may be gauged by considering the following figures applying to the Rand alone. The tonnage amounts in round numbers to some 27,000,000 tons cyanided per annum, and if the cyanide consumption is averaged at the very moderate estimate of 0·300 lb.: 130 per cent. KCy, a saving of 30 per cent. of this amount would mean a total of 1,250 tons of a value of £162,000 per annum (cyanide at 1s. 4d. per lb.). Or if 50 per cent. is taken as the amount which could be saved, it would mean 2,025 tons of cyanide, or £270,000 per annum. These are very big figures, but in my opinion they show conclusively the enormous saving which can be effected by the introduction of the 'Closed System for the Treatment of Ores by Cyanide.'" The net effect of the reading of these two papers, at any rate, promises to be an extended discussion of a side of the industry fraught with considerable possibilities of economy.

PROBLEMS OF THE OUTER RAND.

The definite and apparently conclusive evidence that some of the beds of the Witwatersrand system, and notably the Main Reef Leader of the auriferous zone, have been laid down upon a deltaic area, and in accordance with the conditions of deltaic deposition, obviously throws a new light upon the geological problems of the outlying banket districts. Its bearing upon the reefs of the further East Rand and Heidelberg are clearly illustrated in the distinctly oriented patches of conglomerate which have been observed in the Brakpan, Kleinfontein, and Nigel mines, for example, where the peculiar character of the sedimentation is well emphasised. A prominent feature of the process of deposition within deltaic areas is its tendency towards a more or less rapid lateral variation in the character and arrangement of the sediments laid down, and this is a condition of things which has been shown to prevail in the Eastern conglomerate beds. It is referred to by Mr. W. G. Holford in his discussion of "The Mining Problems of the Eastern Rand Area," where, he remarks, "the deposition of the banket is found to be much less uniform, due probably to the beds being laid down on more uneven surfaces, which resulted in irregularities of deposition. . . . Without going into the various origins of the gold existent in the Witwatersrand bankets, it is found that the economic gold values are contained in irregular areas or zones. In the Central Rand their close proximity to one another almost establishes defined shoots. These zones, however, in the Eastern Rand area are less frequent, and though they exist throughout the various physical conditions of ore deposition, they are of greater economic value where the thickness of the banket is more liberal, which is, as stated in the synclinal areas." Although the purely deltaic origin of these patches of conglomerate has apparently not suggested itself to Mr. Holford, their economic significance is fully appreciated. One self-evident result of this arrangement of the auriferous beds is that prospecting operations by means of boring are likely to prove somewhat more indecisive than they would be in the Central Rand. In this connection Dr. Mellor writes, in his paper upon the East Rand, as follows:—"If, as seems probable, the mode of distribution of the conglomerate described in connection with the Nigel and other mines should prevail over a large portion of the far East Rand, it is obvious that the disposition of a series of boreholes in an approximately east and west line is more likely to give definite results than any other arrangement. The location of such isolated patches of conglomerate as exist in the Nigel area must in the first instance be largely a matter of chance, and their continuity in any direction can only be proved by a series of holes placed comparatively closely together." The point to be emphasised is that as a consequence of this gradually decreasing uniformity in stratigraphic conditions the further one recedes from the original shore line, or, to be more accurate, from the original source of sedimentation, the more irregular and uncertain are the conglomerate deposits likely to become. So far the variation has been clearly traced in a south-easterly direction, owing to the limits within which exploration has been made possible by the structural arrangement of the strata in those parts. There is no reason to suppose that similar changes will not be found to have taken place in other directions along the southern and south-western extensions of the conglomerate area. The probability is, indeed, that they will become more pronounced in the region of the Vaal River, and that the diminution in thickness of the several groups of strata in the Upper Witwatersrand system, together with the erratic disposition of the auriferous beds, will combine to make exploration exceedingly difficult in that neighbourhood. These are matters that deserve very serious consideration on the part of those who are inclined to base their calculations upon normal sections of the Witwatersrand system as traced through the Central Rand. Not only are merely structural conditions liable to great change as one leaves the line of productive mines far behind, but, for similar reasons, the average gold values, also; not, perhaps, to anything like the same degree, but certainly to an appreciable extent. From this point of view, the want of success which has hitherto attended the many ventures that have had their little say along the border of the Orange Free State is susceptible of easy explanation. The theory concerning the origin of the bankets does not necessarily imply that the furthermost areas of the Witwatersrand basin are uniformly unprofitable, however. It merely emphasises the necessity of handling the geological problems of those areas in quite a different way from that in which they have commonly been dealt with.

THE WAR AND RAND METALLURGY.

Nothing better illustrates the searching and comprehensive effect of the war than the stimulus it has applied to the intensive investigation of the processes of Rand metallurgy, with a view to the economizing of the materials employed therein. As Mr. J. E. Thomas, in his Presidential Address to the Chemical, Metallurgical and Mining Society the other night, reminded us: "This war has brought home to us, as probably nothing else could have done, our dependence on other countries for the supplies necessary for carrying on our great mining industry, on which so much depends in this great crisis. One can only hope that the lesson will not be lost and that strenuous efforts will be made towards making us, at least to some extent, self-supporting in the future." It had been successfully demonstrated that it was no longer necessary to import lead acetate for cyaniding purposes, as locally-made lead nitrate was cheaper and more efficient. He recalled the consternation in cyaniding circles a few years ago caused by a shortage of lead acetate, due, it was alleged, to the sinking of a few barges containing that salt in some inland waterway in Germany, and also how it was sought to overcome the difficulty by having natives roll barrels containing litharge and acetic acid all over the veld to produce lead acetate. There was also the probability that the Rand's requirements in zinc might be met by the recovery of zinc from waste solutions augmented by zinc ore mined in the country. It was important to encourage the base metal industry in this country. In his opinion the latter industry afforded as good (if not better) opportunities to their younger members, as the gold mining industry did to their older members in the early days of the Rand. Individual members were doing their best to ensure that there should be no lack of the gold needed to back the credit of the Empire. "In the early stages of the war," concluded Mr. Thomas, "it was found that there might be a shortage of gold coinage required to pay native wages, and arrangements were made to have the Mint at Pretoria in readiness to re-start operations. The mining houses were asked if they could produce gold suitable for making coins of standard fineness, and, by the efforts of some of our members, succeeded in doing so. Although it has not been found necessary to mint money here, thanks to our Navy, it is gratifying to know that it can be readily done should occasion ever arise." It was the custom in inaugural addresses to give the Government a metaphorical "prod" and point out to them how lacking they were in their duty of encouraging and supporting the precious and base metal industries. He thought, however, that all would agree to wait for more appropriate times, and that it was their bounden duty at present to support the Government. In another article we deal with the enquiries into the possibility of economizing in the cyanide consumption of the Rand, and this is but another typical effect of the war. And what the mining industry of the Rand has been doing, the whole country should be doing, namely, casting about in every direction to make itself more self-contained, self-reliant, and self-supporting.

THE UPPER WITWATERSRAND SYSTEM.

Salient Points in Dr. Mellor's Geology—The Main Reef Leader Eastwards—The Truth About the Slate Footwall.

In preparing his report upon the work of the Geological Survey along the Witwatersrand, Dr. Mellor found that the nomenclature adopted in early days, and confirmed by popular usage, was not only scientifically incorrect, but led to a very indefinite grouping of the members of the Upper Witwatersrand System. In proposing a nomenclature more in accordance with sound geological usage, he says:—

> Something, however, might be done to bring the use of important geological terms like the word "series" more into line with accepted usage for other systems of rocks in this country, and by geologists generally in other parts of the world. To limit the use of the term to the groups of conglomerates, as is at present the custom, seems quite illogical. The intervening quartzites are in many instances larger groups of beds, and should also, to be consistent, be termed "series," thus introducing needless complexity. Simplicity is perhaps the first virtue in classification, and the simplest way to avoid the present anomalies would seem to be to speak of the various groups of conglomerates simply as "Elsburg Reefs," "Kimberley Reefs," "Bird Reefs," etc., and to reserve the word series for larger sub-divisions of the system. A glance at the section of the Upper Witwatersrand System given will suggest that the formation in question falls very naturally into two groups of quartzites and conglomerates separated by the Kimberley Slates, and this suggestion is in agreement with experience in the field. Although it is a point to which I have devoted special attention in mapping, over the whole length of the Rand, I have never been able to find any well marked horizons which could be used for subdividing these larger divisions satisfactorily, and this is also most probably the reason why hitherto the conglomerate groups alone have received special names and why no attempt has been made to classify the intervening quartzites, in some cases thousands of feet in thickness. Theoretical divisions which cannot be applied to work in the field, to borehole records, or in any other definite way, can scarcely be justified. It would seem best therefore to dignify as series only the two main groups of quartzites and conglomerates into which the Upper Witwatersrand System naturally falls. In order to disturb existing names as little as possible these two series might be termed respectively the *Main-Bird Series* and the *Kimberley-Elsburg Series*. The combination of such familiar terms as Main and Bird in *Main-Bird Series* will probably obviate any danger of the "series" being taken to apply to "reefs" alone, since it would scarcely occur to anyone to combine the widely separated Main and Bird "reefs" into a single series without including the intervening quartzites and other associated beds. In accordance with long-established custom on the Rand, the Kimberley Shales were no doubt originally named with reference to the "reefs" next above them. To avoid confusion this necessitates their inclusion in the Kimberley-Elsburg Series, although otherwise they would have been associated more naturally with the quartzites below them. In dropping the use of the word "series" in connection with the various groups of "reefs," and using simply the terms "Elsburg Reefs," "Bird Reefs," and so on, a difficulty arises in connection with the Main Reef and its associates (commonly called the "Main Reef Series"). The particular conglomerate horizon known as the "Main Reef," and still more its associates, the "Main Reef Leader" and the "South Reef," certainly possess well-marked characteristics which clearly distinguish them as individuals. Moreover, it would be entirely opposed to local usage to suggest any such thing as a plurality of "Main Reefs." The simplest way to avoid perpetuating the misleading use of the word "series" in this connection, and one which would be in sufficiently close agreement with ordinary geological usage would be to substitute the term "Main Reef Zone," a course which will be followed in this and in a subsequent paper on the East Rand. Where it is desired to refer particularly to the "reefs" alone to the exclusion of the quartzites or other beds which accompany them, a sense in which the words "Main Reef Series" are frequently used, such a term as "Main Reef Group" might be used if considered necessary.

EAST RAND MODIFICATIONS.

Having described the characteristics of the various beds and reef of the Main Reef zone at some length, laying emphasis upon the very striking individuality of the Main Reef Leader and its well-defined footwall, over many miles of country, Dr. Mellor proceeds to summarize his observations as follows:—

> "If now we review the conditions described above in connection with the Main Reef Leader and the beds associated with them, we may say that as we pass from the Central to the Eastern Rand the following modifications of the Central Rand Section are noticeable:—
>
> (1) *The considerable body of quartzites, grits and pebble leaders which underlies the Main Reef* in Central Rand sections usually known as the Main Reef Footwall Quartzites progressively diminishes in thickness and in coarseness of texture, and ultimately disappears or becomes so similar in character to the upper portions of the underlying Jeppestown Series that no distinction can be made between the two.
>
> (2) Similarly the *Main Reef* itself shows a gradual decrease in development, and in the eastern section of the East Rand Proprietary Mines becomes intermittent and difficult to recognise, probably dying out altogether in the far East Rand.
>
> (3) The *Main Reef Leader* shows a remarkable persistency in character and relationship, and is recognisable as a definite individual in almost all sections from the Central, through the East Central, and into the far East Rand. It almost invariably shows a sharply-defined "footwall parting," representing a distinct and even bedding plane, which is remarkably persistent throughout the whole area, and is in that respect in contrast to the irregular bedding and variable character of the beds upon which it rests.
>
> (4) The *beds between the Main Reef and Main Reef Leader*, which in the Central Rand rarely exceed a few feet in thickness, and may be represented by a mere parting, frequently attain a very considerable thickness from the Primrose Eastwards, and include besides slaty beds similar to the typical "Black Bar," which is the most conspicuous member of the group in the Central Rand, deposits characterised by great and rapid variations in thickness and texture. These deposits range from almost purely argillaceous beds to carse conglomerates, and frequently take the form of "Bastard Reef," in which pebbles of considerable size are widely scattered through a matrix which varies from fine argillaceous to coarse gritty material.
>
> "The great variability of the beds which immediately underlie the Main Reef Leader, and which separate that reef from the Main Reef itself, is of particular importance because from it have arisen most of the uncertainties in the correlation of the reefs in various mines, and particularly in the correlation of the Central with the far Eastern Rand. In this connection it is especially important to bear in mind the part played by the slaty developments of these intermediate beds, which have been referred to under the name of "Black Bar." We have seen that this slaty or argillaceous type frequently immediately underlies the Main Reef Leader, and that, while it is usually represented by a comparatively thin slaty band, it occasionally swells out to very much larger dimensions. This is even the case in the very centre of the Rand —e.g., in the Village Main and City and Suburban Mines. It is, however, more characteristic of the East Central Rand, and is well exemplified in the Primrose and Glencairn Mines. Still further east these lenticular developments of argillaceous rock below the Main Reef Leader become, if not more frequent, of larger dimensions both in thickness and in lateral extent, so that the Main Reef Leader may rest upon a thick "slate" footwall over very considerable areas. Further these more extensive developments of the slaty footwall are associated with a greater thickness of very irregular beds comparable to the Bastard Reef of the Glencairn, and at the same time the Main Reef and its underlying quartzites show a distinct falling off in development and are increasingly difficult to recognise."

THE "BLUE SKY" PROBLEM.

That old bone of contention, the "slate" footwall of the Cason and Blue Sky mines, is then dealt with:—

> "Bearing these occurrences in mind, we find it not so surprising that in the Cason Mine the Main Reef Leader should pass on to a 'slate' footwall in the same way as it does in many other instances west of that locality, and that this slate footwall should persist over considerable areas in the Blue Sky Mine, where practically no other form of footwall is met with. It appears to be very generally assumed that this slate footwall in the Blue Sky represents a very big body of slates comparable to those of the Lower Witwatersrand System, with the uppermost of which it is supposed to be identical. As a matter of fact, with the exception that the Blue Sky reef rests on 'slate,' we know very little about the beds in the footwall of the reef in that area. There is, however, at one or two points good evidence to show that the slates underlying the Blue Sky reef are not of very great thickness, and are in turn underlain by a group of quartzites and pebbly grits comparable to those seen, say, in the Cason Sections. These grits and quartzites rest in turn upon a very large body of slaty beds, which there is little doubt represent the topmost band of slates of the Lower Witwatersrand System. It seems therefore that the slates which actually underlie the Blue Sky reef are to be regarded as one of the local slaty developments of the 'Black Bar,' while the quartzites below correspond in part to the similar beds associated with the Black Bar in the Cason sections. It is of course probable that the Main Reef and its underlying footwall-quartzites may also be represented, but from the way in which these latter members of the section are seen to diminish in importance in the East Central Rand it appears likely that at this point they are not very strongly developed. Owing to the discouraging character of the reef for some considerable distance east of the Blue Sky Mine, our knowledge of the conditions of the footwall is not so extensive as it is in the area west of that locality. The evidence, however, from many boreholes and mine workings of an exploratory character show that the Main Reef Leader (i.e., the Blue Sky Reef) east of this point continues to rest upon a

slate footwall throughout the area occupied by the Boksburg, Apex and other mining properties which connect the Blue Sky area with those of Kleinfontein and Van Ryn."

Footwall Beds of the Blue Sky.

The other footwall beds below the Blue Sky slates are thus described:—

> "The body of quartzites and pebbly grits lying below the slates in the Blue Sky section represents the Main Reef footwall quartzites, probably combined with beds which belong to the coarser types of deposits frequently associated with the Black Bar in many sections to the west. The conglomerate bands associated with these coarser beds in the Blue Sky section may possibly represent the Main Reef—the limited exposures at present accessible make it difficult to obtain sufficient evidence to justify a very definite opinion of this point. The character of some of the associated beds make it at least equally probable that they may correspond to the pebbly bands frequently associated with the Black Bar in all the mines immediately to the west. The gradual diminution in thickness of the Main Reef footwall quartzites going east, as well as the decided tendency they show in the mines in the neighbourhood of the Cason to become markedly finer in texture render it highly probable that these quartzites do not persist far beyond the Blue Sky area, but, becoming finer in texture and more mixed with argillaceous material, merge into the general body of argillaceous rocks below. Similarly the Main Reef itself probably also dies out or is very feebly devloped, and the irregular pebbly deposits met with at intervals below the Main Reef Leader in the far East Rand are to be regarded rather as corresponding to those associated with the Black Bar on the Cason sections than to the Main Reef itself. About the continuity of the Main Reef Leader and its persistence into the far East Rand there is, however, no room for reasonable doubt. This reef can be followed without a break from the Cason into the Blue Sky Mine, and its passage on to a slate footwall can be definitely and clearly seen, points which I have been able to personally verify. Further, the continuity of the reef from the Blue Sky into the properties of the Boksburg, Apex, Benoni, Kleinfontein and Van Ryn, as well as into the Van Dyk and Rand Collieries Mines has been demonstrated by innumerable boreholes and shafts with a completeness that must be rare in mining experience."

MINING CONDITIONS ON THE RAND.—II.

By W. L. HONNOLD.*

BRAKPAN MINES.—*Continued.*

The procedure in breaking ore is influenced by the dust factor and the consequent importance, as well as the advantages, of drilling wet holes. It is, therefore, the practice when using machines of the reciprocating type to resort to underhand stoping and, when using hammer drills with hollow steel, to back stoping. In opening a stope, work is usually started at both the bottom and top of the winze, which, as already noted, is 9 ft. in width. A winch is placed at the top to deal with the upper portion of the stope, and another half way down to raise and lower the trucks that serve the bottom section by way of the level below. The benches at first conform to diagonals from the winze to the levels, giving the appearance of underhand stoping at the top of the winze and overhand at the bottom, but after reaching a distance of about 100 ft. on either side their lateral extension is checked and they are advanced mainly in the direction of the winze until the stope is opened throughout. Each face is then more or less parallel to the winch track, from which laterals have been thrown off at intervals of 35 ft. for extension as required. "Backs" vary from 300 to 1,200 ft., according to the influence of dip on the distance between levels. Stope pillars of good size are left where necessary, especially along fault lines, and these, together with frequently placed "pig-sty" packs, sufficiently support the roof. As the faces advance right and left the roof of the interior gradually subsides, the weight being taken by the packs. This may or may not call for the shifting of winch tracks. Serious falls of roof seldom occur and the isolation of the ore bodies precludes regional movement, and, therefore, renders sand filling or other permanent support unecessary. After a stope has been mined out and cleaned, unless there are special reasons for keeping it open, the pillars are drawn, a large proportion of the pig-sty poles are recovered, and the roof is allowed to completely collapse. Rock packs are seldom resorted to in the stopes but, in combination with rock walls, are generally employed to protect levels and haulageways that may have to be maintained through worked-out stopes.

The cost of stoping during 1914 was, for large machines 98c. per ton broken, and for small machines 1.20 dollars. After allowance for the included ore from development faces and other sources, and for the waste rock discarded in sorting, the general average on a per-ton-milled basis was 1.03 dollars.

Shovelling, Tramming, and Underground Haulage.

This subject may be divided into two stages. The first covers necessary handling at the working face, hand tramming to the winch track, hoisting or lowering in trains to a level, and hand trimming to a haulageway. The second covers delivery by means of endless-rope haulage to a shaft bin.

Rigid trucks, of low design and adapted to the tipples, are used. They hold $20\frac{1}{2}$ cubic feet, equivalent to one ton of ore, have a height of 2 ft. $11\frac{3}{4}$ ins. from top of rail, and a length over buffers of 5 ft. 3 in. The truck body is of steel and the bottom is curved to a 17-in. radius. Bottom and ends are of 3-16-in. plates and sides of $\frac{1}{4}$ in., a stiffening ring 2 by $\frac{1}{2}$ in. running around the top and greatly adding to the general rigidity of the body. Brackets, suitable for the Cradock type of overhead clip, are riveted to the ends, which are stiffened by a 3-16-in. plate on the inside. The underframe is built of 6 by 4 in. oak, cut to fit the cylindrical bottom of the body, to which it is securely bolted. Cast-steel wheels of 15-in. diameter are used, one being fixed and the other running loose on a 2-in. steel axle which is fitted with a cast-steel grease sleeve. The wheel base is 18-in. and the gauge, as previously stated, 24-in.

Of the natives working on shovelling and tramming, 43 per cent are loading boys employed at the face. They are on piecework and receive from 8c. to 10c. per truck, which includes loading and delivery to the main winch track, and they handle somewhat over 6 tons per shift of 8 hours. The remainder includes boss boys, winch drivers, rope boys, track boys and level trammers, the last-named constituting about one-fourth of the total. These are on day's pay, averaging about 50c. per shift.

The cost of shovelling and tramming in 1914 was 68c. per ton trammed. This figure includes all expenditure from the working face to the haulage and covers development as well as stoping. It is unfavourably influenced by the fact that this class of work offers the best opening for inexperienced and surplus natives.

In the initial stage of production all ore was hand trammed to the main incline, but with increasing tramming distances the supplementary system of subsidiary haulages has had to be gradually brought into operation and is still in course of extension. Stations for hand-trammed traffic are arranged in accordance with circumstances. Four natives are usually required for knocking trucks on and off, the rope being lifted by hand out of or into the clips.

All the haulages, as previously mentioned, are provided with double tracks of 30-lb. rails, laid on timber sleepers to 24-in. gauge, and the necessary endless-rope equipment. The gears are electrically driven and designed for a rope speed of two miles per hour, at which rate little trouble is experienced from runaway trucks or other mishaps.

The cost of operating all haulages in 1914, during which period a total of 705,775 tons was delivered to the shaft bins, averaged 10c. per ton, about 75 per cent. of the amount representing white and native labour, 5 per cent. power, and the remainder ropes, fittings, workshops, and sundry stores. This also covered the transportation of tools and supplies. Obviously, in comparatively considering the problem of underground haulage, it is necessary to take into account the mileage involved, as well as hoisting and surface transport.

Ore Reserve and Grade Control.

Stopes, as well as development, are regularly sampled in detail, and at the beginning of the year the ore reserve is computed. Previously included "blocks" are then recalculated, if their faces have been altered by stoping or further development, and the new tonnage is taken in at its estimated value.

Owing to the elongated form of the ore bodies a block between adjacent levels can be estimated with fair accuracy before winzing. A third face justifies greater confidence, but, if provided by a winze or stope in the central and richer portion of the body, it may somewhat exaggerate the average assay value and render it necessary to apply an "assay-plan factor" in calculating the probable recovery value of the ore reserve. No such correction, however, is called for in respect of total gold, since over-estimates of the assay value are offset by under-estimates of tonnage, due to the fact that development does not always expose the full width of the reef. The lateral extent of the bodies is seldom sufficient to warrant more than one winze; hence blocks with four faces exposed are rare. The correct estimation of stope width is a matter of great importance because of its bearing on tonnage and recovery value. Each block has to be carefully considered and an allowance made for the inches of hanging wall and foot wall which will probably be included in stoping. Experience has shown that the combination of a flat reef and machine mining will seldom permit of stopes less than 48 in. in height and consequently this figure is taken as a minimum, even though the reef may be abnormally thin. Experience has also shown that, regardless of the thickness of reef, at least 15 in. will be broken outside the "reef channel" and that a further allowance may have to be made because of "slips" to which the ground will inevitably break. Taking the mine as a whole, the average stope widths exceeds the average reef width by about 22 in. The details of calculation need not be referred to, as they involve customary steps and precautions, In the end the results are compiled so as to show the numbered blocks in consecutive order, their area on dip, reef width and value, stope width and value, and tonnage. The blocks of profitable grade are then classified and cast under three headings, depending on whether they are available for stoping, in process of becoming available, or locked up in shaft or other pillars. A record is also kept of the blocks that cannot be worked to advantage in existing circumstances. It is found in practice that, on further opening, the latter frequently provide a considerable tonnage of profitable ore. About 73 per cent. of the ore broken comes from the ore reserve, 17 per cent. from development faces, and 10 per cent. from other sources. The last-mentioned sources include selected portions of old blocks previously classified as unprofitable, new blocks not yet taken into account, pillars, hanging-wall leaders subsequently discovered, and odds and ends from old workings. Ore falling under this category is usually of lower grade than that from the ore reserve. This is still more marked in respect of development, since it is not easy to eliminate the rock from the poor faces, and even the product of the good faces suffers because of the abnormal proportion of waste which has to be included in breaking. The factors just referred to, coupled with sorting practice and milling extraction, enter in some degree into all forecasts of future recovery. A typical calculation may perhaps simplify the matter. Assume :—

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* Paper read before San Francisco Meeting of A.I.M.E., September, 1915.

	Per Cent.		Dwt. per Ton.
	73	From ore reserve	6.7
	17	From development	2.8
	10	From other sources	5.6
	100	to sorting plant	5.98
Deduct	14.5	excluded by sorting	
Deliver	85.5	to mill	6.93
Recovery, with 96 per cent. extraction, say			6.65

Clearly, any variations in the assumptions would correspondingly affect the result. It is necessary, therefore, in making a forecast, either to put forward a definite figure as a measure of existent conditions in the light of probability, or to give limiting figures sufficiently comprehensive to cover the various contingencies which may arise. Among the factors of doubtful bearing may be mentioned the uncertainty as to native labour, since variation in the supply may alter the relative quantity and quality of ore from the three sources mentioned, and possibly the percentage of sorting. The position and outlook as to development may also enter. Furthermore, there is always a chance that the grade may vary more than anticipated owing to an unusual combination of the irregularities of enrichment. Of course, the number and the widely differing values of the faces afford an equalising influence, as well as a means of adjustment, but not to the extent of insuring persistent uniformity. In order to guard against undue depletion of the richer areas, as well as of those more favourable to cheap working, a monthly analysis of the blocks mined is prepared. This includes the fathomage and proportion taken from each block during the month, its assay value and width as determined by current sampling, and the assay value and width of the blocks as at the time of the last calculation of the ore reserve; also totals and averages. Comparison of the average assay value and width of ground stoped with corresponding figures of the total ore reserve discloses whether the ore broken was of mine grade and width. And, of course, any over or under-mining is apparent. Comparisons on a yearly basis are also interesting in that the monthly fluctuations are eliminated and the accuracy of ore-reserve estimates is more clearly defined. They show that as a rule the average of stope assays is slightly below that of the blocks, the winzes, as previously explained, probably exerting an undue influence on block sampling. But, as against this, they also show that the average reef width determined by stope sampling exceeds the corresponding figure for the blocks. The latter gain, as already stated, is probably due to the incomplete exposure of the reef at certain points along the levels, and the net result in practice is that the total gold recovered per unit of area closely agrees with the amount indicated by the ore-reserve estimate.

Springs Mines.

The remarks previously made as to the characteristics and significance of Brakpan Mines are, generally speaking, applicable to Springs Mines and, together with the specific references already made, sufficiently indicate the outstanding features of this property. Briefly, the position is that, after six years' work and an outlay of over 4,000,000 dollars, the mine is now ready for equipment and other expenditure that will involve 1,500,000 dollars to 2,000,000 dollars additional expenditure and fully two years' further deferment of interest. Fortunately, as already intimated, the showing of the development so far accomplishment is remarkably good. The company's holding totals 1,960 acres. The shafts are similar to those at Brakpan. They have been described, together with some particulars of conditions and procedure, in a paper by B. D. Bushell, entitled "Notes on Sinking Operations at Springs Mines," which was discussed by the Institute of Mining and Metallurgy, London, at a meeting held on May 22nd, 1913. The outstanding feature of interest was the quality of water dealt with in passing through the dolomite. In the north shaft it was first encountered at 460 ft., and it could not be "caught up" until after the Witwatersrand quartzite was reached at 605 ft. For a period of seven months the average rate of sinking was only 27.3 ft. per month and the average quantity of water hoisted was over 2,000,000 gallons per day. Haulage ways are necessarily an important feature of the underground layout. It will be noted that six are already well advanced, and now that the main incline has been connected it is the intention to start two others from its middle point as soon as possible. In view of the Brakpan experience it was felt that the flatter dip of the reef called for still greater recourse to straight-line development. Fortunately, but little water has been encountered, notwithstanding the unusual quantity in the dolomite above and the fact that faults and dikes often occur. Progress, therefore, has as yet been unimpeded and, although water may still be met with, the haulageways are now so far advanced that serious inconvenience is improbable.

Teniente Topics is the title of a magazine now being published by employees of the Braden Copper Co. in Chile. The initial number, dated June, 1915, presents the "Early History of the Braden Copper Co.," by William Braden, and contains besides some interesting descriptions of hunting expeditions and sports participated in by members of the Braden staff. It has a section in Spanish, and in many respects is most interesting. It is officially published by the Teniente Publishing Co., at Sewell, Rancagua, Chile. All concerned are to be congratulated on the successful start they have made.

Large Copper Mine, Tsumeb, G.S.W.A.

THE YEAR WITH THE SIMMER AND JACK.

Working Profit £334,556—Analysis of Working Costs—Manager's Review of a Trying Period.

THE annual meeting of the Simmer and Jack was held yesterday, and a full report of the proceedings will appear in our next issue. The profit on working for the year, after taking into account the expenditure of £4,179 16s. 10d. on renewals and replacements of machinery, plant, etc., amounted to £334,556 3s. 5d.; sundry revenue amounted to £20,016 17s. 7d.; making a total of £360,573 1s.; deduct contributions to the Miners' Phthisis Compensation Fund, estimated profits tax and income tax for the year, expenditure due to the present war and sundry amounts written off, £64,193 7s. 2d.; making a total credit to appropriation account of £296,379 13s. 10d.; add balance at credit of appropriation account at 30th June, 1914, £85,816 13s. 9d.; total, £382,196 7s. 7d. From this amount there was appropriated:—For dividends Nos. 25 and 26 of 5 per cent. each, declared during the year, £300,000; for reserve for machinery, additions and renewals, £7,500; less expended on renewals and replacements and charged to working costs, £4,179 16s. 10d.—£303,320 3s. 2d.; leaving a credit balance to appropriation account at 30th June, 1915, of £78,876 4s. 5d. The annual report of the directors shows that the area of the mining property, on which claim licenses and mynpacht dues are paid, is equal to a claim area of 624·270 claims, which is the same as last year. The claims are held as to 425·086 under claim licenses and 199·184 under mynpacht title, and are situated on the farm Elandsfontein No. 11. Of the above claims held under mynpacht title, the New Primrose Gold Mining Company, Ltd., have the lease of 3·428 claims for mining purposes and the surface rights of 11·599 claims. Of the total number of claims, 246·07, however, lie to the north of the outcrop. It is estimated by the Superintending Engineer that the intact claim area at 30th June, 1915, was equal to 122·084 claims, of which 25·817 claims are in dyke, leaving an intact reef-bearing area equal to 96·267 claims, in addition to which a considerable tonnage of ore is available as reclamation from areas already stoped out. The company also owns seven machine stands (five of which are leased to the Victoria Falls and Transvaal Power Company, Ltd.), four diggers' stands, all of which are under lease, and seven water-rights, six of which are situated on the farm Elandsfontein No. 11, and one, which was acquired during the year, on the farm Driefontein No. 1. In addition to the above, the company holds the right, under a lease from the Rand Mines, Ltd., to the water in the water-right on Elandsfontein No. 6, forming a portion of Victoria Lake. The area of the company's title, which consists of a portion of the farm Elandsfontein No. 11, comprised at 30th June, 1915, 1,264 morgen 231 square roods 20 square feet. Of the above area, a portion, 142 morgen 468 square roods 6 square feet in extent, has been laid out into the following townships:—Germiston and North Germiston (which are owned entirely by the company), East Germiston, West Germiston, Germiston Extension, and a portion of South Germiston (in which townships the company holds a two-thirds interest), and the company's portion of the Primrose Township, leaving the area of the company's freehold (exclusive of the freehold area undisposed of in the townships, which is shown below) at 30th June, 1915, at 1,121 morgen 363 square roods 14 square feet.

The report of the manager, Mr. O. P. Powell, gives the following interesting details of working expenses:—

	Amount.			Cost per Ton Milled.	
				s.	d.
Mining and pumping ...	£325,081	16	7	8	0·523
Development	23,663	21	11		7·026
Transport of ore, sorting and crushing	15,957	6	8		4·738
Milling	39,002	11	2		11·581
Tube milling	23,558	16	9		6·995
Sand expenses	36,153	5	3		10·735
Slime expenses	25,287	5	5		7·508
General mine charges ...	40,567	16	10	1	0·045
	529,272	11	7	13	1·151
Renewals and replacements	4,179	16	10		1·241
	£533,452	8	5	13	2·392

Mr. Powell adds:—

The number of feet developed during the year was 6,281, exceeding that of the previous year by 2,498 feet. The estimate of payable milling ore developed at 30th June, 1915, shows a decrease both in quantity and value from that of the previous year. The position is such, however, that these figures will be appreciably increased in the near future by the completion of development round blocks at present included in partially developed ore. Both values and widths of ore recently exposed by development in the lower levels are very satisfactory. For some time past it has been realised that the final exhaustion of reclamation rock from the outcrop section was rapidly approaching. The ore from this section has always been low in value, and though in the past it has been very profitably worked, conditions have changed, large patches no longer exist, and working costs have increased. In consequence it has been found necessary to raise the pay limit, which will have the effect of further reducing the available ore from this section. To compensate for this loss of tonnage, development in the lower levels has been carried out so as to give smaller blocks and a larger number of faces available for stoping. The existing incline winding engine at No. 1 shaft was not sufficiently powerful to deal with the increasing tonnage from lower levels. It was decided to replace it with a larger and more powerful engine. The work in connection with this was started in the year under review and is now practically completed. The sand filling plant has been extended and all current sand residues are now lowered into the mine. Various improvements have given the system the flexibility of a water service. I have at various times commented on the advantages derived from sand filling, and can only add that in an old mine and a mine showing pressure on the lower workings as this mine does, the importance of sand filling can in no way be exaggerated. For some time past the supply of white labour, especially with regard to underground work, has been very unsatisfactory. With the view of trying to induce men not to throw up their employment lightly in order to obtain work on other mines, every effort is being made to improve the conditions of life on the mine. Certain blocks of single quarters have been re-conditioned throughout, sitting rooms and conveniently arranged bathrooms have been added, and these improvements are much appreciated by the occupants. The year has been a trying one for all members of the staff, more especially those heads of departments who have seen many of their best workers depart for the campaign in South-West Africa, from where they have returned and re-enlisted for service in Europe. I would like to place on record my appreciation of the loyalty with which they accepted my decision that it was their duty to remain on the mine. All officials have had to work hard in order to keep things going with a large proportion of the temporary hands quite inexperienced. That this has been done is a tribute to their tact and tolerance.

The Allis-Chalmers Company is not so well known in Wall Street as it is in the mining industry. The following story is from the New York *Sun*: "Allis-Chalmers used to be described for the sake of convenience as the company which made everything in the world except money. But now that it is a war stock nobody alludes to it flippantly any longer. A broker just back from a holiday met one of his old customers. 'Say, what is this war bride they call Allis-Chalmers?' he called out. 'Why?' asked the broker. 'Oh, just curiosity. Last week I called up your office and they told me Allis-Chalmers was a hot one. So I bought a hundred. Now I have six points profit in it and I haven't the faintest idea whether it's a motor company, a street railway or a combination of barber shops.'"

HIGH MINING SALARIES.

Study for Certificates as Mine Captains, Mine Managers, Surveyors, Mechanical and Electrical Engineers, and Engine Drivers. Private Tuition and Correspondence Lessons, where personal tuition is impracticable. Practical Mathematics and Electrotechnics. E. J. MOYNIHAN, Consulting Engineer, Cuthbert's Buildings, Corner of Eloff and Pritchard Streets, Johannesburg. 'Phone 3664.

STOPING METHODS AND DRILLING PROBLEMS ON THE WITWATERSRAND.

[By E. M. Weston.]*

What are the best methods to be employed in breaking rock? This is and always has been the most important question on the Rand. In solving this problem lies the greatest hope of substantial decrease in working costs. Owing to the peculiar conditions on the Rand it is, perhaps, the hardest to solve of any mining problem. This subject is of paramount importance, and there is no doubt today that stoping is the department in which the greatest waste and inefficiency occur. Despite the something that has been done, and the attention now directed to the matter, there is a lamentable lack of knowledge of the subject and a need of scientific experimental work to establish a right body of doctrine and to point out right lines for advance. It is left for manufacturers to bring up schemes and machines for trial under more or less unfair conditions, and the real causes of failure, and the places where advance has been stopped by a blank wall, are not marked out. Who, for instance, would care to say boldly that for work in flat stopes of the future the path of advance lay in perfecting hammer drills rather than changes in piston-drill practice? In other countries, mores especially in America, where the problem is somewhat simpler, the lines of advance have been marked out, and progress to the extent in some cases of having stoping costs has been attained. But this was obtained only by scientific research and by calling in an army of trained observers, and with stop watches to supplement the work of mechanical genius. We need to know whether progress on a field like the Rand lies upon parallel lines, or whether the circumstances are so different that other means must be adopted. What we need first to be sure of is, what is the best and cheapest method, under the local conditions, of introducing the most suitable explosive into the rock to be broken, and how are we to introduce it so that its maximum effect can be obtained? Can we, by education or organisation, modify local conditions to bring them into line with those elsewhere, or are the physical factors different and permanent?

Rand Stoping Conditions.—Visits underground all along the Rand emphasise the fact that these questions are not answered. In general the stoping practice and efficiency are much below what is known to be possible, even under present conditions, and, with regard to further progress, there is a state of irresolution and disagreement on a number of important questions. If we ask what is the best way to break rock in large, medium, or small stopes, whether by large piston drills, large hammer drills, smaller drills of both kinds, or by hammer boys, under the same conditions, we meet different opinions. If we ask how many machines of various sorts a white employee can efficiently supervise we receive different answers. It is true, of course, that conditions in dip, hardness, and character of stopes vary, but there is no body of doctrine to tell us just how much weight should be attached to such factors in attaining to a right solution of the problem. To arrive at any useful result the numerous factors of the problem must first be correctly set out and then their relative importance carefully weighed. Some are human factors and are hard to estimate. In a recent report of one of the mines it was stated that hammer drills had not so far been a success, because, among other things, the cost of sharpening and replacing hollow drill steel was just twice as much as it was with solid steel for piston drills. But is this decisive? What is this cost per machine shift or per ton broken with both types of drills? Does it more than counterbalance any advantage of greater footage drilled, which hammer drills may possess?

Elements of Drilling Cost.—To conduct an inquiry into the problem as at present known, we need first to ascertain what are the separate costs involved in breaking rock and how they depend on one another and their relative importance. In using rock drills, we have first the capital cost of providing compressed air and conveying it to the working faces, the cost of providing a rock drill equipment and fittings, and a stock of drill steel, with facilities for its conveyance and sharpening. These costs should be spread over the total tonnage mined, allowing for interest and amortisation of capital. In breaking rock by hand labour we have to provide somewhat more accommodation for labour, and a smaller amount in regard to equipment and drill steel; but in practice the rock drill costs can never be eliminated, as development must be carried on by rock drills, and fluctuating labour supply usually compels an almost similar amount being spent on plant and equipment as a stand-by against shortage of native labour. The running costs for breaking rock by machines will be: Cost of supervision, cost of white labour, cost of native labour, air costs, including cost of pipe-laying and of air hose, cost of explosives, cost of maintenance and sharpening of drill steel, rock drill repairs and replacements, and, as compared with hand labour, the cost of the extra stope widths involved by moving, sorting, and crushing more waste broken with greater shock to overlying strata, as against relatively cheaper breaking with larger stope width and a better supply of material for packing. I need not enumerate the fewer items of costs involved in hammer work. If stoping be carried out on right lines it should follow that the amount of rock broken per shift increases as the footage drilled, so it follows that the most valuable asset in any machine drill is undoubtedly maximum drilling power, because the total of all costs worked out on "per foot drilled" or "per ton broken" is decreased as this increases, as it is a direct division of them. This maximum drilling power is not necessarily maximum drilling speed, but may be expressed as $S\left(\frac{t}{t'}\right)$ in which S=maximum drill speed, t=drilling time, and t'=total time of shift. Obviously it is no use having a machine that can drill six inches per minute if, owing to the difficulty in handling it, owing to breakdowns, or to the fact that it blunts or breaks drills quickly, it is drilling at its proper speed only one hour per shift against two or three hours of another slower and more reliable machine. The next desirable qualification of the ideal drill is, that it permit boring holes placed so as to be most effective in removing rock and breaking it with the least expenditure of explosive at a minimum total expense per foot drilled. This can be done in two ways, first, as already pointed out, by spreading the total cost over as large a footage as possible, and, secondly, by reducing those costs by economising in labour, air, repairs, drill steel, and supplies. It requires sound judgment to know to how great an extent we can safely increase any one of these items to procure a given rate of increase in drill speed, and just how much we can safely reduce any of them if that reduction has any adverse effect on drill speed. The cost per foot drilled may be determined by the formula :—

$$C=\frac{L+A+R+S+S'}{DS}$$

in which

C = cost per foot drilled
L = labour lost
A = air cost
R = repair cost
S = steel cost
S' = supplies cost
DS = drilling speed.

We have to strike a wise balance in every direction. If we increase nominal drilling speed too greatly we are sure to increase the cost of repairs and for drill steel; and the very fact of these being increased will nearly certainly mean that there will be more breakdowns, more delay during the working hours, and, consequently, loss of drilling time and drill power. It would then be a mistake to endeavour to attain high efficiency or low expense by paying too much attention to one factor at the expense of a more important one. Under the mining conditions prevailing on the Rand to-day, however, efficiencies react on one another. For instance, the air pipes that supply drills at various working faces are often far too small. The use of a fast drilling machine that required a large consumption of air would in those circumstances cause a great amount of friction and loss of pressure in the air pipes, and the drill would be supplied with an insufficient amount of air at a pressure too low. It would fail to realise its proper speed and would be inefficient; whereas a drill very economical in the use of air but with lower nominal drill speed would prove efficient. There is another aspect af the question that cannot be ignored when discussing drilling speed. I have assumed that extra footage drilled or the power to drill extra footage means increased tonnage of rock broken. This does not by any means hold true in practice, and this complicates the question. We need with our ideal drill that during its working time it should drill just the right length of hole to be most efficient, and that it should be able to drill the hole in such a way that each has on it, and is able to break, the greatest burden that the maximum amount of explosive which can be economically placed in it will move. In developing on the East Rand, for instance, it was repeatedly proved that a 3¼-in. drill could put in six or seven 6-ft. holes, including a dry hole. Yet in stoping drilling, with wet holes only which are quicker to drill than dry holes, we have but four or at most five drilled. Some of the reasons no doubt lay in less attention being paid to preparing the working place beforehand, but the real cause is that the type of bar and arm used being the same as that used in development, the miners did not know how to drill to any greater advantage.

(*To be continued.*)

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*In the *Mining Magazine*.

MINING INSTITUTE.

TEACHING CENTRES:—{ JOHANNESBURG AND SCHOOL OF MINES, KIMBERLEY.

Prof. YATES prepares candidates for the following Government Certificates:—
MINE MANAGER'S.
MINE OVERSEER'S.
MECHANICAL ENGINEER'S.
ELECTRICAL ENGINEER'S
MINE SURVEYOR'S
by Class, Private Tuition and Correspondence

SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - - 66% „
MECH. ENGINEERS - June (Kimberley Centre) - - ALL „
MINE OVERSEERS - - - - - Practically ALL „
NEARLY 200 SUCCESSES. St. James' Mansions, Eloff Street.

TRANSVAAL CHAMBER OF MINES' QUARTERLY REVIEW.

The Industry and War Questions—Withdrawal of Robinson Group—Native Labour and White Wages.

The report of the Executive Committee of the Transvaal Chamber of Mines has the following, *inter alia*:—During the three months ended 31st August, 1915, the disbursements amounted to £11,759 3s. 8d. This amount includes the quarterly contribution to the Transvaal Miners' Phthisis Sanatorium, £1,290 7s. The receipts were £10,094 6s. 9d., including £5,000 transferred from fixed deposit and refunds in connection with the Sanatorium contribution. The sum of £10,000 is now on fixed deposit, and the balance to credit of current account on 31st August was £2,031 5s. 1d. The returns supplied by the Witwatersrand Native Labour Association, Ltd., show the following results for the months of June, July, and August, 1915. Number of natives employed by members of the Association on last day of month (including natives in the service of mine contractors, but excluding natives in the employ of members of the Association in the districts of Barberton, Breyten, Rooiberg and Orange Free State):—

	June.	July.	August.
On gold mines	184,155	190,026	196,866
On coal mines	9,019	9,371	9,943
On diamond mines ...	—	—	—
	193,174	199,397	206,809

The Witwatersrand Native Labour Association and the Native Recruiting Corporation furnish the following information with regard to the natives recruited by the Association and its members and the Corporation during the months of June, July, and August, 1915, and the districts whence they were obtained:—

Source.	June.	July.	August.
East Coast—South of Latitude 22 deg. S. . .	3,106	3,745	4,737
Cape Province	4,697	6,584	8,219
Transvaal Province	870	1,083	1,135
Basutoland and O.F.S. Province	1,022	1,699	2,165
Bechuanaland	316	486	491
Natal Province	465	628	611
Swaziland	245	356	530
Rhodesia (including vie Pietersburg)	6	8	5
Local	6,865	7,036	8,486
	17,592	21,625	26,379

The monthly report issued by the Department of Native Affairs shows that at the 31st July, 1915, 264,402 coloured persons were employed in labour districts of the Transvaal. Of this number, 212,632 were engaged on mines and on the various classes of works, *i.e.*, chemical, metallurgical, brickmaking and other works as defined in Part I. of the Coloured Labourers' Health Regulations, 1906, and 51,770 were in other employ. The Joint Committee appointed in June to consider the demands put forward on behalf of mine employees for an increase in wages, and also for modifications in the working hours and overtime of mechanics employed on the Witwatersrand gold mines, arrived at certain recommendations on these subjects, the principal recommendations being as follows:—(1) That a special war bonus of 7s. per week be paid to all married white employees (and to single white employees with relatives wholly dependent upon them) who earn £4 10s. per week or less. (2) That as regards mechanics the maximum working hours, excluding overtime, be fifty hours per week, the wages of such men to be calculated on an hourly basis. (3) That overtime be paid to mechanics at the rate of time and a quarter, an additional hour (to be paid for at ordinary rates) being added to all overtime actually worked, except when worked in continuation of ordinary time. The recommendations of the Joint Committee were adopted by the Executive Committee, and are now in force on the mines affected. In July intimation was received that the Imperial Government had authorised the Chamber to offer an opportunity for 200 mechanics (fitters, erecters, riggers, machinists and boilermakers) to volunteer for munition work in Great Britain, the engagements to be for the period of the war, or any lesser period at the option of the Imperial Government. A free railway ticket and free third-class passage to England was offered, also a free return passage. The Executive Committee appointed a small sub-committee of engineers to take the matter in hand, and within a very short time the full number authorised was obtained, principally from amongst the employees of the mines. The contingent, which was composed of mechanics of the best type, has now arrived in England. The Executive Committee has decided that in all cases the situations of volunteers on active service with the Expeditionary Force, who volunteer with the consent of their employers, will be kept open for them: that in the case of married men half-pay will be paid to their dependents, and that in the case of single men without dependents quarter-pay will be paid to them, in addition to the present Imperial rate of pay of 1s. per day, so long as that existing rate of pay continues. The Executive Committee has decided that time on active service shall not count towards the completion of apprentices' indentures; that time on active service shall count, however, towards the periodical increments of pay of apprentices, and that in the case of apprentices proceeding on active service in the last year of their apprenticeship, the increments shall continue after that year in the same ratio as is laid down in the indentures. The Transvaal Chamber of Mines Benefit Society has now been in existence for one year, and its financial position is such that, at a recent Special General Meeting, it was enabled to enlarge the objects of the Society to include payment of maternity benefits. An inclusive amount of £10 will be paid in cases of this nature, with effect in each case from the date of the member joining the Society. Mr. T. C. A. Meyer, the winner of the Chamber's scholarship and gold medal for the year 1914, has recently returned from German South-West Africa, where he served with the 2nd Imperial Light Horse throughout the campaign, and on September 10th, at the South African School of Mines and Technology, the President presented Mr. Meyer with the scholarship. Mr. Meyer is proceeding to Australia, with a view of studying mining methods in that country. The Chamber exhibit at the Panama-Pacific International Exposition, 1915, on behalf of the gold mining companies has been awarded a gold medal for its general excellence. The following withdrawals from membership as from 17th August, 1915, have been notified, namely:—The Langlaagte Estate and G.M. Co., Ltd., representative, Mr. J. H. Crosby. The Randfontein Central G.M. Co., Ltd., representatives, Messrs. J. C. K. Pollock, N. J. Scholtz, W. H. Robinson, and W. H. Crawford. The following change in representation has taken place:— Sheba G.M. Co., Ltd., Mr. R. W. Townsend *vice* Mr. G. D. Massey.

Champ d'Or.

In regard to the reduction of capital of Le Champ d'Or French Gold Mining Co., Ltd., which was confirmed by the Court in London on July 28 last, a minute of August 16 (approved by the Court) states that the capital is now £40,500 in 6s. shares, and at the time of the registration of the minute 134,591 shares have been issued and 6s. per share has been and is to be deemed to be paid up on each of the said shares.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

A Plea for the Geological Museum.

To the Editor, *South African Mining Journal.*

Sir,—It is rumoured that the Johannesburg Municipality intends stopping the grant for the Geological Museum and that the Museum will be closed after the end of this month. It is to be hoped that this will not be the case. The Museum has been, and is, of great instructive interest to the public. The curator, too, has been of much assistance to mining men, prospectors, and to the general public, many often coming long distances to get advice on mineral ores, which advice was invariably given with courtesy and to the advantage of those who consulted the curator. The grant is a very small sum and really cannot make so much difference to the town's finances. The benefit derived by the public by keeping it open is of more consequence to the town than the small grant involved.—Yours, etc.,

PROSPECTOR.

23rd September, 1915.

[This matter is dealt with under "Notes and News."—Ed., *S.A.M.J.*]

Chemists for Munitions Work.

To the Editor, *South African Mining Journal.*

Sir,—My Council is in receipt of a communication from Mr. W. Cullen, late Manager, Dynamite Factory, Modderfontein, having reference to the engagement in South Africa of chemists for munitions work in England. It is intended that those accepted will undergo a course of training in the three dynamite factories in this country, the period of such training depending on previous knowledge. During such period a remuneration not yet fixed will be paid. They will then be sent to England for service in munitions works, where the salary will be from £150 to £350 per annum, the latter figure being for senior posts. An official memorandum giving full particulars is in course of preparation by the Munitions Department. My Association has agreed to co-operate with the Chemical, Metallurgical and Mining Society of South Africa in the matter and have arranged to receive applications from those chemists who desire to offer their services. All applications should be sent in writing to the undersigned, Box 5254, Johannesburg, and should state name, address, age, academic qualifications (if any), previous experience, positions held, and copies of three recent testimonials. On receipt of further information applicants will be communicated with.—Yours, etc.,

JAS. GRAY,
Honorary Secretary.

South African Association of Analytical Chemists,
P.O. Box 5254, Johannesburg,
21st September, 1915.

Dr. Mellor's Rand Geology.

To the Editor, *South African Mining Journal.*

Sir,—If the mining engineers and geologists of this country are going to accept Dr. Mellor's dictum, "that the Van Ryn Reef of the Far East Rand and Nigel Reef of the Heidelberg district are extensions of the Main Reef Leader of the Central Rand," as you quote in your article on the subject last week, "then here's another stratigraphist off to America!" In the same issue Messrs. Percy Cazalet and W. W. Lawrie produce a section of normal Main Reef series at the Bantjes G.M. Co.—where I was mill manager in the early days of 1888—which has ever since been an infallible guide for me all the country over; except that these gentlemen have omitted for their purpose, or unrevealed to them maybe, the underlying and overlying reefs, which are inseparable therefrom, such as the North Reef with five others, and the Livingstone Reefs to the south. There are a dozen reefs back and front of the section given, take it where you like or where you fancy, and the series ends up on a big bed of moderately soft shale, some 300 yards distant. The Van Ryn and Nigel Reefs, as worked (bar one, the Chimes), lie on an insignificant bed of pipe clay, with slatey cleavage, and red talcose sandstones beyond, devoid of pebble beds. The sandstones, or quartzites, of the series are a coarse white grit, principally—*vide* Langerman's Kop, in the Bezuidenhout Valley, which is a perfect section, and not a little bit off the top of the Elsburg, as some well-known doctors say. Main Reef sandstones are purple for hundreds of yards—*vide* the Bantjes, for example. These are craft secrets which I have no right to give away, as they have cost scores of years of study, such as no student gives to them nowadays, but rather than see the Far East Rand belittled and reduced to one pay reef only, I feel constrained to do so for the Rand's sake, which is only in its infancy, say what they may. I maintain and firmly hold that the Blue Sky and Main Reef series have yet to be struck on the dip of the Van Ryn G.M. Co., with the Black Reef series overlying them unconformably of course. Such is actually the case on Holgatfontein, Mr. W. Styte's farm, next the Nigel; but my colour-blind friends fail to have observed the fact to this very day, as Marie Vale is still Nigel to them, and not Blue Sky as it should be—*vide* all maps, books, etc. Hence, according to your humble servant, there are not far short of a score of payable reefs to the credit of the Far East Rand instead of one, and the sooner our capitalists and shareholders realise this fact, and insist upon more reefs for their money, the better for them and the country generally. Black Reef has made the Far East Rand of late years, off its own bat so to speak; yea, verily, the same patchy one that Drs. Hatch and Corstorphine decry in their "Geology of South Africa," page 168. N.B.—Yours, etc.,

SCOTT ALEXANDER,
Rand Stratigraphist.

Johannesburg,
September 24th, 1915.

Phthisis Money and How It Goes!

To the Editor, *South African Mining Journal.*

Sir,—With regard to your article on phthisis, may I be permitted to point out that the distribution of phthisis money is an important item as regards working costs and our future prosperity. The day may come when this fell complaint will be eradicated, but in the meantime the present facts must be dealt with. The question of what the compensation should be is not the point, but the method of payment. The fact is that it has become a recognised thing, with commission agents, to be on the keen look-out for men entitled to phthisis money, as it is quite an often heard remark that such and such a business, farm, or investment will suit a phthisis man. There is certainly nothing wrong in such a remark, but it so often happens that when a substantial amount is paid to the recipient, it is eventually lost or frittered away in some scheme which sounds so well, and as a rule is made to look so well on paper. Now a phthisis man is not at his best after he becomes entitled to compensation, hence he is easily led away by specious and glowing promises and anticipations. Further, he has been accustomed to handling good money, which, comparatively speaking, comes rather easily; therefore, he often becomes a prey to shrewd and practised commission men whose business in life is to sell and sell again. It is possible—nay, probable—that there are too many men in Johannesburg, now that it has become such a veteran mining city, who have been compelled through force of circumstances to live on their wits, hence the many pitfalls to miners' phthisis men. Ask oneself, what do they know, as a rule, with a very occasional exception, about business, and all the little secrets or byways in connection with each particular vocation? It would serve no good purpose to labour the subject, but from the known inner workings of "catching" phthisis men's money in bulk having become quite a fine art, and now the elections are on, it may serve a worthy purpose in calling attention to the matter. In conclusion, the idea of this note is to assist and not condemn, and if a good monthly, or perhaps better still, a weekly allowance be made to the men in trouble, it would be far better than distributing a lump sum under any circumstances, as it is necessary to protect people against themselves and the many temptations they are subject to. A member of Parliament has admitted to me that he never looked at the matter in this way. Again, Lord Brassey's noted book on the subject of wages reckons that 15s. from a Government Department is equal to 20s. from promiscuous working. Naturally, when the phthisis money becomes depleted or exhausted, the family's income is stopped, whereas certain guaranteed periodic payments keeps the family above actual want.—I am, etc.,

"BUSINESS MAN."

Rhodesian Section.

LATEST MINING NEWS.

Rhodesian Output: Record for Year—Small Workers and Mine Supplies—Toronto

The Rhodesian gold output for August was declared on Thursday at 82,544 ozs., of the value of £344,493. This is an increase over July of 1,875 ozs., of the value of £7,928. Matabeleland contributed 37,777 ozs., of a value of £157,279, and Mashonaland 44,767 ozs., of a value of £187,214. This is the highest declaration this year.

* * * *

The Rhodesian Small Workers' Association held their ordinary monthly meeting at Gatooma last week. Mr. E. A. Begbie, M.L.C., president, occupied the chair. When the Association met a month ago a letter dated in May last from the Chamber of Mines, Bulawayo, was submitted. It had reference to a proposal that, to relieve the situation, large mines with heavy stocks of shoes and dies should help the smaller mines with a supply. At that date the secretary was instructed to write to Bulawayo and ascertain if this help was still obtainable, and, if not, then he was to write to the Secretary for Mines asking that official to come to the aid of the small workers by communicating with the Imperial authorities with the object of securing facilities for the manufacture and shipment of a sufficiency of the mining spares in question. The reply from the Bulawayo Chamber of Mines was to the effect that the big mines had rendered some assistance in the desired direction, and regretted that that could do no more. The Secretary for Mines wrote that he had interviewed Messrs. Sykes & Co., Fraser & Chalmers, and Johnson & Fletcher, and gave a list of what each of these firms had in stock or were expecting shortly, and added that they were of opinion that there would be no shortage. In the discussion that ensued Mr. F. J. H. Green (Glasgow Mines) said that the total of shoes and dies enumerated by the Secretary for Mines represented only 70 sets, which was not enough for the whole of Southern Rhodesia, and favoured further steps being taken to increase the supply. Mr. J. Mack (Golden Valley) suggested that people who were making shoes and dies and mines that were using them in South Africa should be written to for particulars as to their efficiency and cost of manufacture. The Chairman stated that he had recently interviewed some of the Salisbury suppliers of mining spares, and they had asserted that there was not likely to be a shortage. He also gathered that a shipment was expected from America. He drew attention to the danger that was threatening the gold industry of this country. To-day, he said, Rhodesia was depending more on its gold output than anything else, and if it were handicapped, not only should we all suffer seriously, but other parts of the Empire, that were wanting our contribution of gold won, would likewise be materially discomfited. It was imperative that we should persist in our efforts to obtain an ample stock of mining requisites. Ultimately, it was decided to write again to the Secretary for Mines, thanking him for what he had already done, and asking him afresh to approach the Imperial Government on the matter of their giving facilities for Rhodesia to obtain an adequate shipment of shoes, dies and other spares.

* * * *

The third ordinary general meeting of the Toronto (Rhodesia) Syndicate, Ltd., was held in mail week, Mr. H. J. Selborne Woodhouse (chairman of the company) presiding. The Chairman said: Gentlemen,—The report which has reached you sets forth the position of this company. Before submitting for your approval the third annual report, which I presume you will take as read, I would like to be allowed to make a few remarks. I think I can congratulate the shareholders that, in spite of the war and the serious rebellion in South Africa, the development of the Toronto mine has gone on without any interruption, and I am glad to be able to report that by now we have, at last, reached the producing stage and that we can look forward with confidence to a long and successful career for our property. At the outbreak of hostilities, having no funds in hand, and money being almost unobtainable, we had to solve a most difficult problem. Nevertheless, we were able to raise funds which enabled us to go full steam ahead, under the most trying circumstances, and of this you will be able to convince yourselves from the results obtained. The result of our second trial crushing is very satisfactory, and, in fact, somewhat more than anticipated. The ore was taken from the 10 ft. wide body of reef in the west section, assaying about 10 dwts. to 12 dwts. per ton. Our manager is highly pleased with the plant erected, and, according to his opinion, and also the opinion of other mining experts, our plant will be one of the most effective in Rhodesia. I sincerely trust that it will be only the stepping stone to a much larger plant in the future, when the mines become fully developed. The latest news from the mine is very encouraging, and we attach great importance to the cheap conditions of mining on our property. A cable received yesterday from Mr. Jeffreys says: "Hope to start crushing about four weeks; construction slightly delayed consequent on abnormal circumstances; estimated ore reserves, 29,600 tons, worth £40,000; general prospects good." Considering the small capital of our syndicate, the outlook is a bright one and full of expectation. Regarding our liabilities, I anticipate they can be met by the unissued 50,000 shares which are under option, and I have little doubt that this option will be exercised in due course and that consequently the profits can partly be employed to extend the battery, the balance to be distributed among the shareholders.

Sheba G.M. Co.

The following results of operations at the Sheba mine for the month of August, 1915, are officially supplied:—Tons crushed, 7,440; yield, 2,346 fine ozs.; estimated profit, £1,500.

WRIGHT'S ROPES.

THE WEEK IN THE SHAREMARKET.

Fluctuating at Higher Levels—Effect of the New Budget—Awaiting Developments.

The fluctuations in prices have been more numerous and more marked during the week. The latest War Budget provided, of course, an element of uncertainty, which, however, passed with its publication. On the whole, it seems to have been extraordinarily well received all round. The loan negotiations in New York are also proceeding smoothly; and the news from Russia seems to be more favourable. The local election excitement and the dastardly attack on General Smuts are not likely to do the credit of the country any good or increase the confidence of investors. In these circumstances, it is not surprising that the market should remain in a waiting mood, and that the quotations for the leading stocks should be, if anything, a trifle lower on the week.

* * * *

	Fri. 16th.	Sat., 17th.	Mon., 20th.	Tues., 21st.	Wed., 22nd.	Thurs., 23rd.
Adair Ushers	—	—	—	—	0 3*	—
African Farms	7 3*	7 5*	7 3*	7 3*	7 6	7 4*
Apex Mines	16 9	16 9*	17 6*	—	17 3†	16 9*
Aurora Wests	7 6*	7 6*	—	—	7 6*	7 6*
Bantjes Cons.	5 9*	6 3*	6 0*	6 6*	6 0*	6 0*
Brakpan Mines	60 0†	—	58 3*	58 0*	59 6†	59 0†
Breyten Collieries	—	—	21 0*	21 0*	21 0*	21 0*
Brick and Potteries	—	5 0*	5 0*	5 0*	5 0*	5 0*
British South Africa	10 3*	10 3*	—	10 3*	—	10 3*
Cinderella Cons.	—	2 9*	—	—	—	—
City and Suburbans	44 0	43 0*	43 0*	43 0*	43 0*	43 0
City Deeps	64 0	63 6*	—	63 0*	63 9†	63 9†
Cloverfield Mines	5 4*	5 7	5 5*	5 6	5 3*	5 3*
Clydesdale Collieries	12 0*	12 0*	12 0*	12 0*	12 0*	12 0*
Cons. Langlaagtes	37 0*	37 0*	37 6*	37 0*	37 0*	37 0*
Cons. Main Reefs	18 0*	18 0*	18 0*	18 0*	18 0*	18 0*
Cons. Mines Selection	9 3*	9 3*	9 3*	9 3*	9 0*	9 3*
Coronation Collieries	—	—	26 6*	26 6*	—	26 0
Coronation Freeholds	—	—	—	—	0 3*	—
Crown Mines Debentures	£99*	£98*	—	£98*	£98*	£98*
East Rand Centrals	3 3†	3 3†	3 0	—	—	3 1†
East Rand Coals	1 10*	1 11	1 10*	1 10*	1 9*	1 10*
East Rand Deeps	1 3*	1 6†	1 4*	1 3*	1 3*	1 4*
East Rand Mining Est.	—	—	—	6 0*	—	7 0†
East Rand Props.	21 0	20 9*	—	—	21 6†	20 0*
East Rand Debentures	£85*	£85*	£85*	£85*	£85*	£85*
Eastern Gold Mines	1 2*	1 2*	1 2*	1 2*	1 2*	1 2*
Frank Smith Diamonds	1 4*	1 4*	1 4*	1 4*	1 3*	1 3*
Geduld Props.	31 9	31 9*	31 6	31 3	31 0	30 9*
Glencairns	2 0*	2 0*	2 0*	—	2 0*	2 0*
Goerz & Co.	15 0†	—	—	10 0*	—	—
Government Areas	23 6	23 6	23 3*	23 3	23 0	23 0*
Jupiters	6 6*	6 10*	6 8*	—	—	6 6*
Kaalfontein Diamonds	—	—	0 2*	—	—	—
Klerksdorp Props.	1 6*	1 6*	—	1 6*	—	1 6*
Knight Centrals	10 9*	10 10	10 2*	10 6	10 3*	10 4*
Lace Props.	3 7*	3 7	3 6*	3 5*	3 3*	3 0*
Luipaardsvlei Estates	—	7 0*	7 0*	7 3*	—	7 0*
Lydenburg Farms	3 10*	3 10*	4 0†	3 10*	3 9*	3 10*
Main Reef Wests	7 0*	—	6 10	6 9*	6 9*	6 9*
Main Reef West Debs.	£65*	£65†	£65*	—	—	—
May Consolidated	6 0*	—	—	8 0*	—	—
Meyer and Charltons	100 0*	100 0*	100 0*	—	100 0*	100 0*
Middelvlei Estates	1 2*	1 2*	—	—	—	—
Modderfontein B.	115 0†	114 6*	114 0	110 0*	—	109 0*
Modder Deep Levels	97 6*	99 9*	99 0	99 3	98 6*	98 0*
New Boksburgs	0 10*	0 10*	0 10*	0 10*	0 10*	0 10*
New Eland Diamonds	10 0†	10 0†	10 0†	10 0†	10 0†	10 0†
New Era Cons.	6 9*	6 10*	6 9*	7 0†	7 0†	7 0†
New Geduld Deeps	2 5*	2 5	2 5*	2 4*	—	2 5*
New Gochs	13 6*	13 6*	13 6*	14 0†	13 6*	13 6
New Heriots	—	57 6*	57 6*	57 0*	57 6*	57 6*
New Kleinfonteins	23 9*	23 9	23 3*	23 6	23 0*	23 0
New Modderfonteins	305 0B	302 6*	310 0†	310 0†	310 0†	310 0†
New Primrose	—	8 0*	—	8 0*	8 0*	8 0*
New Rietfonteins	0 10*	0 10†	1 0†	1 0†	0 10†	0 10†
New Unifieds	15 9*	16 0†	15 6*	—	15 9*	16 0†
Nourse Mines	—	—	20 0†	—	—	20 0†
Orange Diamonds	—	—	0 3†	0 2*	0 3†	0 3†
Pretoria Cements	43 0*	43 0*	43 0*	43 0*	—	—
Princess Estates	—	2 0*	—	2 0*	2 0*	—
Rand Collieries	—	2 0*	2 0*	2 0*	—	—
Rand Klips	4 3*	4 2*	4 3	4 0*	4 0	4 0*
Rand Nucleus	1 4*	1 4*	—	1 4*	1 4*	1 4*
Randfontein Deeps	2 9*	2 9*	2 9*	2 9*	2 9*	2 9*
Randfontein Estates	13 0	13 0*	13 0*	12 9*	13 3†	13 0
Robinson Deeps	24 0†	22 0*	24 0†	24 0†	24 0†	—
Rooiberg Minerals	—	15 6*	15 9†	15 0*	15 0	14 6*
Roodepoort Uniteds	2 9*	3 0*	3 0*	3 0*	3 0*	3 0*
Ryan Nigels	—	—	2 6*	—	—	2 6*
Shebas	1 9*	—	—	2 3†	2 3†	2 6†
Simmer Deeps	1 7*	1 7*	1 7*	1 6*	1 7	1 6
S.A. Breweries	31 0*	31 0*	31 0*	31 0*	31 0	31 0*
S.A. Lands	31 0*	31 0*	31 0*	31 0*	31 0*	31 0*
Springs Mines	25 6	25 0	24 6	24 3*	23 9	24 6
Sub Nigels	11 0	10 6*	10 6	—	10 6†	—
Transvaal Coal Trust	40 0†	39 0	38 6†	38 6†	38 0†	—
Transvaal Lands	—	—	10 3*	—	11 0*	—
Transvaal G.M. Estates	30 0†	30 0†	—	30 0†	29 6†	—
Van Ryn Deeps	50 0	49 6*	50 0	49 9*	50 0*	51 0
Village Deeps	35 0†	35 0†	—	33 6*	33 0*	35 0†
Vogel Cons. Deeps	0 9†	—	0 9†	0 9†	0 9†	0 9†
Welgedachts	—	13 6*	13 0*	13 0*	13 0*	13 0*
West Rand Cons.	7 0*	—	—	—	—	—
Western Rand Estates	0 10*	0 10*	0 10*	—	—	0 9*
Witwatersrands	51 6*	51 9*	52 0*	52 0	—	—
Witwatersrand Deeps	26 6*	27 3*	26 9*	26 0*	26 3*	26 3*
Wolhuters	12 0	12 0*	12 0*	12 0*	12 0	11 9*
Zaaiplaats Tins	15 6*	15 6*	15 9	15 6*	16 3*	16 9

A Ex London. B Odd lots. * Buyers. †Sellers.

PERSONAL.

Mr. J. H. Langley has been appointed Inspector of Mines in the South-West Protectorate, with headquarters at Windhuk, and has proceeded with Mr. F. C. Freeman, of the office of Inspector of Mines, Kimberley, thither via Capetown.

* * * *

Mr. A. R. Stephenson has been appointed a director of the South African Breweries, Ltd., to fill the vacancy caused by the death of the late Mr. Frederick Mead. Mr. John Stroyan, J.P., D.L., of Lanrick, has been elected chairman of the company.

* * * *

The death at Maritzburg is announced of Mr. William Mason Hunter, who for many years has been Secretary of the City and Suburban and New Heriot Gold Mining Companies. It will be recalled that the deceased was a brother of the late Sir David Hunter and of Mr. James Hunter, who for many years was closely associated with Sir David as Assistant General Manager of the Natal Government Railways.

* * * *

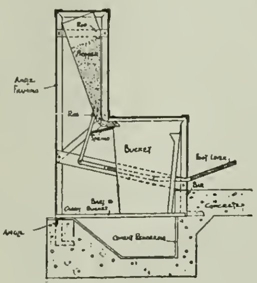
At the Chemical, Metallurgical and Mining Society meeting last Saturday night Mr. J. R. Williams, a past-president, delivered a strongly-worded speech on the position held by Professor Hahn, of the South African College, Capetown, as an hon. president. He hoped that Professor Hahn's name would be removed from the list, and he registered an emphatic protest against it being still there. The President said the matter would be brought up at the next meeting.

German Control of Belgian Mines.

The Germans, it is stated, have organised a sort of general coal bureau at Antwerp in order to exploit the mines which they have taken possession of in Belgium and the North of France. The mineral is divided roughly into two parts, one of which is requisitioned for the needs of the army and the German munition factories. The rest is exported to Switzerland, where it is resold by agents. The manner in which the mines are worked can only be described as devouring the coal. Only one end is considered—the getting of as much out of the pits as possible, without any consideration for the customary operations necessary for the consolidation and permanency of the mines. It is unfortunately only too clear that after the war a considerable time must elapse before the mines can once again be put in a sound condition for their economic working.

Improved Sanitation Underground on the Rand

THE O'BRIEN IMPROVED PATENT DRY EARTH CLOSET SYSTEM.



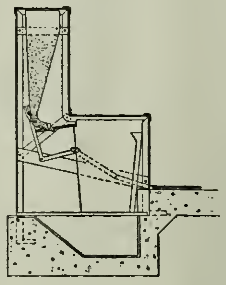
SECTION showing Hopper and Gearing in position of rest, or immediately after foot lever has been released.

The O'BRIEN Premier Dry Earth Closet System has undoubtedly proved itself to be the PREMIER of all dry earth systems, and only requires to be known on the mines to secure its general adoption.

THE PRINCIPLE OF THE SYSTEM IS THE SEPARATING OF THE LIQUID FROM THE SOLID OR FŒCAL MATTER, which is done by mechanism inside the pan. The Liquid is run into a chamber under or near the pan, which chamber is partly filled with a chemical absorbent preparation, and combining with the preparation thereby forms A PERFECTLY PURE, ODOURLESS SOLID, or by other means treated and allowed to flow away pure. The fœcal matter in the pan is automatically covered with a chemically prepared ash, rendering it absolutely odourless, and can be hoisted to the surface and carted away in open carts during the daytime.

The system itself is far superior to any other dry earth system, and has been largely ADOPTED BY THE SOUTH AFRICAN RAILWAYS and by the NEW SOUTH WALES GOVERNMENT FOR ALL BUILDINGS where no sewerage scheme is in use, also by MANY LEADING PUBLIC GENTLEMEN OF SOUTH AFRICA. In simplicity, cleanliness, and convenience it is far ahead of present practice.

Mr. DITCHFIELD will be happy to enter into Special Arrangements with Mines, Municipal and other Public Bodies, and, on application, will furnish estimates, and, if required, designs for the installation and maintenance of the system.



SECTION showing Hopper and Gearing in position while in use.

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Have you ever considered the friction load certain forms of packings put on the rods?

Indiarubber and cotton duck packings not only produce friction, but because of their nature they cannot carry the proper lubricant.

"PALMETTO" Packing keeps the rod well lubricated by the graphited grease that is constantly fed to it from each separate strand.

If your rods are working on hard friction-producing packings let us send you a working sample of "PALMETTO", without charge, in order that you may know the importance of using a packing that does away with rod friction—it also increases the life of the packing.

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Mine Safety, Sanitation, and Welfare Bulletin.

MISCELLANEOUS MINE ACCIDENTS.—III.

[By C. E. Hutton, Inspector of Mines, Germiston District.]

Falls of Material.

More personal injuries are brought about by falls of material underground than any other one cause. Taking the figures for 1914, we see that 412 separate accidents were reported, causing 47 deaths and injuring 378 persons. By far the greatest number of these casualties occurred through stones rolling down stopes, in actual fact 306 out of the 412 accidents were due to this cause, and 59 were brought about through timber and lagging poles falling. There seems to be a sort of general idea that because the angle of repose for a waste dump face is in the neighbourhood of 45 degrees, that any stope having an inclination of under 40 degrees presents little or no danger to workers in such a stope from rolling stones. In reality, however, this is not so, for stones will roll or slide on slick footwalls having a dip of 30 degrees or less. Numerous enquiries have been held into accidents brought about by stones rolling down stopes having an angle of less than 40 degrees. This is a danger which is difficult to guard against; it is ever present, for after each blast stones will be thrown many feet away from the face outside the usual shovelling area. Protecting stulls are usually only erected in stopes that are steeply inclined, that is 45 degrees or over. I would suggest that managements might accept a lower angle than 45 degrees when considering the question of protecting bulk heads. Regulation 103 (1) draws the attention of the ganger to the possible danger due to falling material, this regulation stating that he shall take all reasonable precautions against the injury of persons from the falling or rolling of stones or loose implements or other material. This one short order is the only injunction in addition to Regulation 8 (3) in the Mines and Works Regulations dealing directly with a class of accident which is responsible in a general sense for 20 per cent. of the total number of reported accidents.

Falls in Shafts, Excavations, etc.

Accidents due to the above, namely, falling down steep places, are fairly frequent and usually fatal, for instance, the foregoing table shows that in the 68 accidents, 41 persons were killed and 35 injured. These accidents occurred in all manner of ways, most of which in a sense were avoidable, if the injured persons had not become (I admit it is difficult) somewhat indifferent and careless in the carrying out of their daily task. For instance, we have a case where a man lost his life by stepping back from the top of the skip, probably unthinkingly, and falling down the shaft. Again, a fatal accident occurred to a timberman who was replacing old lagging in a vertical shaft, standing on a plank rigged across the dividers; an upcoming skip in the adjacent compartment caught the projecting end of the stage plank and threw the unfortunate man down the shaft. Two or three fatalities have happened to natives wandering about a mine without a light; they, feeling their way in the darkness, have fallen down unprotected places in abandoned portions of the mine. Another source is due to a person rushing the cage, despite the protest of the cageman, at a station after the signal had been given to raise, the cage moves off as he is about to enter, the result being that he falls down the shaft. We have enquired into accidents where natives have lost their lives by being pushed into the shaft through scuffling in attempting to rush the cage. When large numbers of natives are being pulled from one station, double barriers should always be erected, so that the number of natives for one cage load may be passed through the first barrier and there to await the cage. By such an arrangement the natives waiting to ascend will not be subjected to pushing as they wait near the edge of the shaft. Cases have occurred where natives have been placed on the work of cutting hitches in the footwall of steeply inclined stopes, and whilst so engaged have slipped and fallen with fatal results. To prevent such accidents the managers of the mines in the Germiston district have framed a special rule, making it compulsory that boys whilst engaged on such work shall be securely fastened to life lines.

Struck by Cages or Skips.

By disregarding Regulation 25, several deaths have resulted. This regulation does not allow persons to perform work in shafts in which winding operations are being carried out, unless the persons so engaged are securely protected from the skip or cage as well as from rolling stones and falling material. Natives employed in incline shafts as skip boys have been killed through being struck by skips. It has come out in the evidence taken that it was the practice for skip boys on certain mines to remain on the track after the loaded skip had been rung away, instead of, as they should have done, getting either on the platform or in the ladderway. The skipman has no right to ring away a loaded skip from a box until he has satisfied himself that his spillage or loading boy is clear of the shaft, for in doing so he contravenes the afore-mentioned regulation. Inefficient protection of foot travelling ways in incline shafts which have a dip of less than 45 degrees has been the cause of several fatal accidents. Regulation 52 lays down that in all shafts the foot travelling way shall be adequately railed off, so as to prevent any person inadvertently entering the winding compartment. This regulation in non-steeply inclined shafts is generally complied with by erecting a single hand rail, but this protection has been proved to be insufficient for the reason that in many cases the clearance between the skip and the afore-mentioned hand rail is only a few inches. Should a person travelling on the ladderway allow his body to project over the hand rail into the shaft, he stands a chance of being struck by a passing skip. More protection should be afforded by adding at least two more rails above and below the present existing single hand rail.

Breaking of Hauling Ropes.

Under this head eight deaths occurred in 1914, four of which were due to ropes breaking on incline planes and in winzes, and four through the breaking of a winding rope in a main shaft. When I tell you that 34 ropes serving winzes and incline planes have broken, causing 30 deaths and injuries to 25 persons during the last five years, you will, I hope, be able to appreciate how important it is to lay down these little hauling plants on sensible mechanical lines, and also the necessity for the periodical inspections of the winding arrangements being made by a man who knows his work. Because of this heavy accident list it would appear that there is a want of proper supervision underground in regard to the inspection of these small winding plants. According to law, the resident engineer is responsible for all machinery, but it is quite impossible for him to personally make the necessary frequent inspections. The scheme of supervision recommended by the Mine Managers' Association is that the resident engineer appoints a person or persons to make periodical inspections, the results of which to

"PRACTICAL MINING ON THE RAND."

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be recorded in a log book, and they are responsible to the resident engineer for the safety and proper working conditions of the underground machinery. While underground these persons deputed are under the control of the responsible underground officials and to ensure their safety. This practice meets with the approval of the Mines Department, given of course that "periodical" means a regular period of at least once a month. It is often noticed that rope leads from winches are full of awkward turns carried over small guide wheels, consequently one must come to the conclusion that the underground officials who are responsible for the placing of the winches must be of the opinion that anything is good enough for the job. We have records of fatal accidents brought about through snatch blocks being used as lead pulleys for winch ropes, due to the fact that the latch of the blocks have opened, and so allowed the rope to jump off the sheave, bringing about a sudden jerking load of such a degree that the rope breaks. You, of course, are aware that should a rope serving a winze break, the workers in the bottom of the winze have little chance of escaping injury.

(To be continued.)

THE WATER SUPPLY OF THE RAND.—VIII.

[By W. Ingham, Chief Engineer, Rand Water Board.]*

The Metropolitan Water Works, London.

The Metropolitan Water Act was passed in 1902 and the present Board took over the responsibility of the Administration of the undertakings in 1905. The New River Water Works, which were founded in 1571, form part of the Metropolitan Water Works. To show the magnitude of the undertaking, some of the principal statistics are given below. The area of supply includes the whole of London proper and also that of greater London, and the population within the area on March 31st, 1914, was 6,721,207. The average daily supply during the twelve months was 36·16 gallons per head of population. The number of workmen engaged under the Board is 3,264. The capital expenditure up to April 1st, 1914, was £48,728,930. The total income of the Board for water rents for the last financial year was £2,985,400, or an average of £2 11s. 3d. per service. The quantity of water supplied per day during the last year was 244·3 million gallons, of which 58·8 per cent. came from the Thames, 23·8 per cent. from the Lea, and 17·4 per cent. from wells and other sources. The Board have now 49 storage and subsidence reservoirs, and these have a capacity of 12·908 million gallons, a quantity rather less than that provided in the Vaal River reservoir under the new Bill. 172 filter beds have been provided and these have an area of 17·69 acres, or 0·8 of an acre per million gallons filtered per day. The average rate of filtration per sq. ft. per hour varies between 0·89 and 1·94 gallons. The number of engines installed up to the present is 276 and the total horse power is 42,998, while the boilers number 500. The weight of coal consumed last year was 190,457 tons. The length of water mains within the area is 6,411 miles. The run-off from the Thames and Lea valleys for the year ending March 31st, 1914, was as follows:—

	Area in Square Miles.	Rainfall in inches.	Run-off in inches.	Total Flow in Million Gallons.	Run-off per Cent.	Yield per Sq. Mile in Million Gallons.
River Thames ...	3,855	27·93	9·27	517,557	33	134·256
River Lea	414	24·22	7·01	42,047	29	101·564

The hardness of the water from the two rivers is given below:—

	Total.		Permanent.
Thames	22·16	......	5·77
Lea	25·96	......	6·85

The total hardness is similar to the water from Zwartkopjes, but the permanent hardness is about 200 per cent. higher.

The Purification of Water.

During the last decade considerable improvements have been made in the purification of water for potable purposes. The slow sand filters, which were first installed by Mr. James Simpson in 1828, at the London Waterworks have proved eminently successful for filtering water from upland catchments where the quantity of silt is comparatively small. Slow sand filters were designed originally for only removing matter in suspension, but Professor Percy Frankland found that the number of bacteria were also greatly reduced—as much as 98 to 99 per cent. in some cases—during the time the water was passing through the filter bed. Slow sand filters held the field in England for many years, but during the last twenty years mechanical filters have come into vogue and are now being installed in many waterworks. In some cases chemical precipitants have been used for throwing down the suspended matter in the water, whilst in others primary filters of the Peuch-Chabal type have been installed before passing the water through slow sand filters. The Paterson system has been installed at the Cheltenham Waterworks for purifying the water from the River Severn, and the results have been very satisfactory. There are numerous types of mechanical filters on the market, and those of Candy, Mather & Platt, Bell Bros., and Blakeborough Bros., are amongst the best British types, while the Jewell type (U.S.A.) has been largely adopted in America and Egypt. Owing to the high rate of filtration, which is 2,500 gallons per sq. ft. for mechanical filters, as compared to 50 gallons per sq. ft. per day for slow sand filters, the prime cost of the former plant is much lower than that of the latter plant. Those of the mechanical type are usually installed in conjunction with chemical precipitation, sulphate of alumina, alumina ferric and lime combined with permanganate of potash are commonly used as coagulants for precipitating the silt which is present to a certain extent in all large rivers. By the adoption of sedimentation tanks and chemical precipitation, the greater portion of the silt is thrown down and the bacterial contents of the water reduced by about 86 to 88 per cent. A new type of filter designed by Mr. Deacon, son of Dr. Deacon, the late Chief Engineer of the Liverpool Waterworks, and known commercially as the Ransome-van-Mehr Drifting Sand Filter, was tested at Toronto in 1913 and 1914, and an order was afterwards placed by the Toronto Municipality for an installation capable of purifying 60 million gallons per day. This system is illustrated by a lantern slide. The outer layer of sand is always on the move and carries the matter in suspension with it. After passing through the moving layer of sand, the water passes through a cone of stationary sand. The moving sand is constantly being washed and returned to the top of the filter, as shown on the lantern slide. An experimental plant will shortly be installed at Vereeniging to filter the Vaal River water, which contains during certain floods as much as 1,050 parts of silt per million parts of water by weight. The two main conditions essential to successful filtration are:—(1) The filtration process must be started gradually after the filter has been cleansed; (2) the rate of flow through the filter must not be excessive. Dr. A. C. Houston, the Director of Water Examination for the Metropolitan Water Board, London, has proved definitely that the mere storing of river water in large reservoirs for a period of about three or four weeks is sufficient to exterminate all pathogenic germs and causes a great reduction in the number of those of a non-pathogenic nature. He also strongly recommends the addition of lime for the reduction of germs, but although this may be advantageous in the case of Thames water, it will not, in my opinion, be beneficial for all classes of water. It is now usual as an extra precaution, to sterilise water for potable purposes and especially so in cases where the catchment area is closely inhabited. Several methods have proved successful and the principal ones will now be referred to.

(To be continued.)

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* **From Presidential Address read before the S.A.I. of E.**

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Business Erratic and Uncertain—Goods Coming Forward Even Better—S.A. Cement Demand Extra Good.

Business is erratic and uncertain, which is an apt description of the position. It has even been remarked that things were so quiet in the Commercial Exchange that it took the members half their time in endeavouring to find a substantial reason for the quietude. Perhaps the nearest to an enlightenment was vouchsafed in a department other than mining, where a general merchant stated that certain goods should have arrived by a particular ship, but were shut out at the last moment in consequence of the British Government having commandeered a large space for cargo. Under these circumstances it is not too much to assume that if space can be commandeered for any one thing, it can be done for urgent mining material when necessary, and undoubtedly the mines are going, and must go, full steam ahead to supply bullion for war purposes. Therefore it is not surprising that they have eased off buying and using very freely from reserve stocks, now that indications show that everything will be done on the other side to keep supplies well up to requirements. Already values are slackening, although not very pronouncedly so far. The recent Customs receipts and railway tonnage also go to show that goods are coming through from oversea quite freely again, therefore with very few exceptions the stocks of Johannesburg merchants are accumulating. An experienced broker states that September has been a poor month in the mining material and other heavy goods lines, and so far as he is personally concerned, business has gone off considerably, because the more the merchant stocks increase, the less they purchase from one another in town, and since the war an extra lot of local interchange of trade has taken place, obviously to the benefit of the commercial brokers. There is less demand from Rhodesia, presumably because a number of small batteries and prospecting work have been closed down through so many men having joined the forces.

The Scarcity of Cement.

In consequence of the practical stoppage of imported cement through the requirements of the military oversea for trench and other war purposes, as well as the difficulty of obtaining freight, there is quite a shortage in cement in South Africa. The fact is, through the acute competition in the production of cement it was knocked down to 6s. 3d. per bag, which brought forth quite a number of local industries, such as reinforced concrete building pillars, paving squares, and so forth, also at the price mentioned, quantities of cement were used instead of lime. In the early days, for example, dagga was used for plastering the cheaper and medium class of buildings without an atom of lime, hence much trouble to-day in refloating the wall surface. Then came the blue lime period of the Rand, which still holds good, as the lime is an excellent local production; as a proof of that, there is quite an extra demand for lime at the present moment, which in a minor kind of way can be used in place of cement. However, whatever shortage there may be at the moment is only of a temporary nature, as the Pretoria Cement Co. is pushing on with their new and additional works at Ottoshoop. It is obvious also that the present works are hustling to overtake orders already on the books.

Wire Ropes.

In an interview with a wire rope importer, it was ascertained that although stocks in town are anything but plentiful, yet the mines have plenty, as a result of heavy buying immediately after the war started. The price is now about 33⅓ per cent. over the pre-war rates, but is not expected to advance for the next few months. The fact is that the steel used in the manufacture of wire ropes is also in demand for shell making, therefore the raw material is not too abundant, and the requirements of the Admiralty are very great for steel ropes, and they have the first call upon the British makers.

Iron Steel and Sundries.

The values of all kinds of pipes and fittings are rising in Britain, but so far there has been no corresponding advance in Johannesburg, as local stocks are very fair and there is no great demand. The acute scarcity in shovels has been relieved, as there is a very decent British shovel in the market at 32s. 6d. per dozen, instead of 35s. In hammer handles also the shortage has been overcome and the prices have fallen from 1s. to 4s. per dozen according to the lengths. Flat galvanised iron is in better demand, as it is being used for many purposes in place of zinc sheets, which have risen since the war from 4½d. per lb. to 1s. 6d. now. A big advance is expected in glycerine, even on the top of the present price of 1s. 6d. to 2s. per lb., as compared with 10d. before the war, as the British Government are using all available glycerine in the manufacture of high explosives. Another chemical which advanced somewhat is hypo., which is largely used by photographers, but fortunately it is being made locally and sold at 8d. per lb. wholesale. The timber trade is much the same, with, however, an advancing tendency in anticipation of the Government giving out some new school works.

Electrical Goods.

Pure rubber flex is unobtainable in town, excepting at a few places upon a retail scale of 1s. per yard, instead of the ordinary quotation of from 4d. to 6d. However, the acute shortage is expected to be relieved in a week's time as advices are to hand that shipments are on the water. Cleats are also scarce, the price having risen about 3s. per 100, according to size. Coils of wire of the two standard sizes are up 3s. a coil. Lamp holder cord grips are down 1s. per doz. Electric fans are up 5s. through a limited assortment being on hand; the quotations are from 45s. to 60s., instead of from 40s. to 50s. each; none to hand since the war. Lamps, especially British, are plentiful, therefore the highest values are not being maintained. Altogether business is quite good, with signs of an improvement in household installations.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; mild steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in., 6d. per lb.; ½ in. up to 2 in., 37s. 6d.; 6 in., 35s.; over 6 in., 32s. 6d.; ⅝ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 30s.; over, 29s.; ⅞ in. and 1 in., 29s., all per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 40s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7¾d. to 8d., 11 ft. 8¼d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6d., 9 ft. 6¼d., 10 ft. 6½d.; flat galvanised, 18 to 24 gauge 27s., 26 gauge 28s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 30s. to 35s. per 100 lbs.; solder, 50 per cent., 1s. 3d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9⅜d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d.

£500 REWARD.

In order to obviate any false impression which might be created among our valued clients in consequence of misleading statements which are being disseminated concerning our Company, we now offer the above mentioned reward to anyone disproving the following facts.

Mr. B. Raffael, late principal of the firm now trading as J. K. Fulton & Co., has never, at any time, had any interest whatsoever in our Company.

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and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 3s. 9d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.

Bricks, cement, lime, etc.: Cement, nominal, 32s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 20s. 6d. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 42s. 6d. 2/5 galls.; coal tar, imported, 8s. 6d. to 9s. 6d. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 22s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 11s. 11d. 2/5; petrol, 22s. 2/5; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £18 per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 4s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 3d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; radiator lamps, 4s. 6d. each; double pure rubber flex, 1s. per yd.; 3/20 coils of wire, 27s. 6d., do., 3/22, 23s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 15s. to 18s. 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

FERREIRA DEEP, LIMITED.

(INCORPORATED IN THE TRANSVAAL.)

DECLARATION OF DIVIDEND No. 26.

NOTICE is hereby given that an Interim Dividend of Seventeen and One half (17½) per cent., Three Shillings and Sixpence (3/6) per share, has been declared by the Board for the period ending 30th September, 1915.

This Dividend will be payable to Shareholders registered in the Books of the Company at the close of business on 30th September, 1915, and to holders of Coupon No 26 attached to Share Warrants.

The Transfer Books of the Company will be closed from the 1st to the 7th October, 1915, both days inclusive.

The Dividend will be payable to South African Registered Shareholders from the Head Office, Johannesburg, and to European Shareholders from the London Office. 1, London Wall Buildings, London Wall, E.C., on or about the 4th November, 1915.

Holders of Share Warrants are informed that they will receive payment of the Dividend on presentation of Coupon No. 26 at the London Office of the Company, or at the Credit Mobilier Francais, 30 and 32, Rue Taitbout, Paris.

Coupons must be left four clear days for examination, and will be payable at any time on and after the 4th November, 1915.

By order of the Board,

RAND MINES, LIMITED, Secretaries.

S. C. STEIL,
Joint Secretary.

Head Office,
The Corner House,
Johannesburg, 18th September, 1915.

1 39

Johannesburg Consolidated Investment Company, Limited.

(Incorporated in the Transvaal).

Notice of General Meeting of Shareholders.

NOTICE IS HEREBY GIVEN that the Ordinary General Meeting of Shareholders in the above-named Company will be held in the Board-Room of the Johannesburg Consolidated Investment Company, Limited, on TUESDAY, the 9th NOVEMBER, 1915, at 11.30 o'clock in the forenoon, for the purposes following :—

To receive and consider the Statement of Accounts and Balance Sheet for the period ended the 30th June, 1915, and the Report of the Directors and Auditors thereon.

To elect four Directors in place of those retiring, in terms of the Company's Articles of Association.

To elect Auditors, and to fix their remuneration for the past financial year, and to transact any other ordinary business of the Company.

By Order of the Board,

W. H. MARDALL, Secretary.

Johannesburg, 20th September, 1915.

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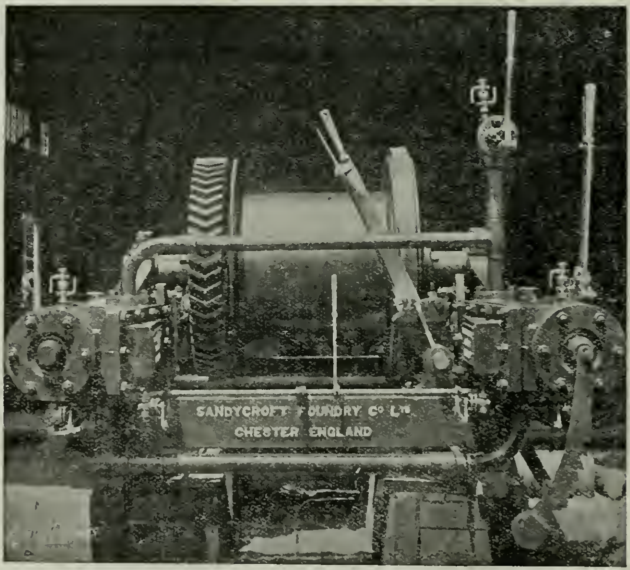

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Engineering Notes and News.

MACHINERY ACCIDENTS ON RAND GOLD MINES.

At the last meeting of the South African Institution of Engineers, Mr. C. B. Pattrick epitomised his thirteen and a half years' experiences as an Inspector of Machinery in a paper upon "Machinery Accidents on the Witwatersrand Gold Mines," a subject which he said, as far as he knew, had never specially been discussed. This was probably because the number of machinery accidents was small as compared with those due to other causes. Dealing only with the year 1913, Mr. Pattrick said that the total number of separate reported accidents was 2,299. To obtain the percentage of machinery casualties due to these accidents, 829 consecutive reports on separate accidents, all of which had occurred in the Johannesburg district during the year named, were examined. Of these, 75 proved to be "machinery accidents." The number thus examined, 829, being over 36 per cent. of the 2,299 reported, would give a fair average percentage. The average compensation per reported casualty was for injured whites £160, for killed whites £527, for injured natives £13, for killed natives £10. Altogether a sum of £16,867 was paid in compensation by the mines for machinery casualties. But there was in addition a number of charges for which no figures were available, and that could only be estimated. For example: Transportation to mortuary, 10s. per head; hospital charges at varying prices for Europeans and natives per day; burial and capitation charges; cost of enquiries, etc.

Counting the Cost.

The total calculated cost of machinery accidents was £18,000 in hard cash for items which it had been possible to figure in. To this, however, must be added the cost of certain items of which it had been impossible to get even an approximate estimate. This included period of contract lost while temporarily off work; repatriating permanently injured natives; loss of efficiency due to replacing trained by untrained labour; loss on cash advanced to natives on recruiting; police court proceedings, usually two or three times adjourned, which generally on each occasion take several highly-paid officials from their duties; making good damages to machinery and plant, often trifling, but as often very expensive; and interruption of production operations. Apart from the moral and humanitarian aspect which was outside all calculation, there was no doubt that the total of £18,000 would considerably have to be increased. The total calculated costs of casualties resulting from preventable machinery accidents was £6,527, and 35·8 per cent. of the calculated cost of casualties due to all machinery accidents. On realising the immense cost of machinery accidents, one naturally wondered if it were not possible to adopt some measure which would save even a portion of this large sum of money. Mr. Pattrick pointed out that the inspection of boilers, winding plants, and elevators was undertaken by the Inspectors of the Department of Mines, but there was no provision for the inspection of other machinery. The "competent engineer" was responsible for "compliance with the regulations affecting the safety of persons." There was no limitation. On and below the surface the engineer was responsible at law.

Regulations Ignored.

The Government Mining Engineer could, however, call for the appointment of a second engineer and a division of the duties. The duties of the resident engineer were multifarious, and in some cases it would almost seem that the time at his disposal did not permit him to give to general safety measures the same close detailed attention which was given to boilers, winders, and ropes. Mr. Pattrick quoted article 178 of the Regulations, which reads: "Where any workman, especially a person of colour, is unable to read the regulations, the person in charge shall see that such workman is made acquainted with the regulations concerning him or appertaining to his particular occupation and duties," and said he had no hesitation in stating that want of compliance with the spirit of this regulation was largely responsible for accidents classed under the heading: "Fault of injured person." The experience gathered at enquiries was that often enough the person in charge had no knowledge of a coloured workman's language beyond the equivalent of "Go," "Come," and "Quick." On one mine this class of accident had largely been reduced by sending a native policeman with an intelligent native who was required to work machinery. The policeman thoroughly acquainted the worker with the regulations before the latter started work. The importance of the cost of accidents on the Rand was to be shown by the following comparisons:—It would admit of a bonus of £14 12s. being given to every person on the technical staffs of the mines; on the total value of machinery erected at industrial concerns on the Rand it represented a dividend of over 12 shillings per cent.; it represented £1 18s. 9d. on every stamp at work; the cost of preventable accidents alone amounted to 1·18 times as much as the total value of the gold recovered by the alluvial workers throughout the Union.

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Coal Buying on the B.T.U. Basis.

At a recent coal trade gathering in Minneapolis (U.S.A.), Mr. W. H. Groverman, of the Island Creek Coal Sales Company, made some informative remarks on the B.T.U. system of buying coal and its practical application. "The greatest trouble about the B.T.U. test," he said, "is as to whether it really represents the coal. If you ship 1,000 tons, and take a small portion for testing, it becomea very important how that sample was obtained. The question always is, does that little article represent the whole you are shipping. Ninety-nine times out of a hundred it does not. I have taken samples from the same wagon and they did not analyse within 25 per cent. of each other. One sample might run 13,000 B.T.U. and another sample of the same car 15,000. The only fair way is that when selecting the sample it must be taken in large proportion so that it will represent the lumps, the screenings and impurities, and in fact, everything that goes under the boiler. But sample taking is often left to irresponsible parties. The most foolish thing in specifications is asking for the greatest number of B.T.U. at one cent cost. If you offer 60,000 heat units for one cent, and another offers 70,000, the buyer will take the higher number of units, thinking he has a bargain, but as a matter of fact he has got skinned. I have seen coal that would run 15,000 and only about 60 per cent. efficiency was got out of the boiler. That is, the boiler could only use 60 per cent. of the heat given off. Another coal with 14,000 units developed 80 per cent. So the question of getting the most heat units for a cent is the selection of the best coal which meets the particular boiler plant conditions. There are no two conditions alike, no two locomotives alike, no two fire-boxes alike, no two locomotives burn the same amount, running the same number of miles, of the same coal. We must take into consideration the condition of the atmosphere and the physical make-up of the boiler, items which make it impossible to make a comparison. There is only one way to make a proper selection of coal. Put it into a plant and see what can be got out of a ton of it. I claim you must burn the coal to find out. B.T.U. are only for the purpose of identifying the particular coal the purchasing agent has selected by this method, and he then should bind the coal seller by contract to deliver this same coal every day in the year."

New Patents.

168. Robert Douglas.—Improved manufacture of pectous compounds.
169. Samuel Milbourn Tweddill.—A new fanlight opener.
170. Samuel Milbourn Tweddill.—A new joint or coupling for fencing and other wire.
171. Leon Saint Denis Roylance.—Ore reducing process.
172. Leon Saint Denis Roylance.—Ore disintegrator.
173. Leon Saint Denis Roylance.—Agitating electrical amalgamator.
174. Leon Saint Denis Roylance.—Ball-bearing gland.
175. James Dunlop Wilson.—A water-tight joint for use in blasting explosives in mining, quarrying, railway tunnelling and the like.
176. James Henry Ruthven.—Automatic rotating hammer drill for water boring and the like.
177. Sandycroft, Limited, and Edward John Williams.—Improvements in and relating to guides or bearings for shafts.
178. Arthur Edwin Leigh Scanes and the British Westinghouse Electric and Manufacturing Co., Ltd.—Improvements in vacuum ejector apparatus.

INVESTORS' DIARY.

FORTHCOMING COMPANY MEETINGS.

Oct. 27.—Rooiberg Minerals.
Oct. 29.—Knights Deep.
Nov. 3.—Rand Klip.
Nov. 9.—Johannesburg Consolidated Investment Co.
Nov. 19.—Glynn's Lydenburg.

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Box 654.

Seven Months' Union Trade.

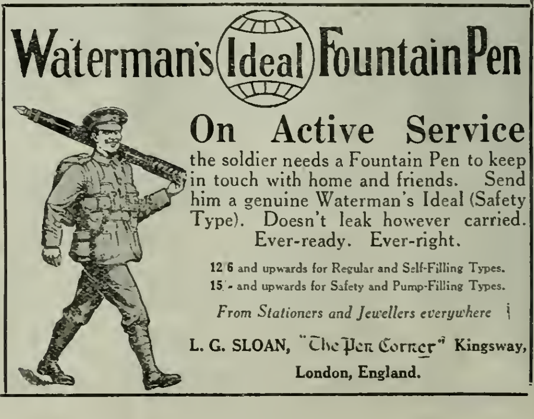
The returns issued by the Customs Department for the seven months ending July 31st show that the total imports of merchandise into the Union amounted in value to £15,594,636, as against £20,364,246 in the first seven months of last year. The decrease is very nearly at the rate of 24 per cent., but this decrease has been registered almost entirely in the early months of the year. The principal increases may be most conveniently indicated in tabular form:—

Seven Months' Imports.	1915.	1914.
Wheat	£748,728	£397,679
Drugs and Chemicals	596,584	546,979
Bags (coal, grain, etc.)	409,824	311,568
Spirits, potable	193,801	180,669
Confectionery	147,435	113,362
Fish, preserved	130,219	109,631

The chief decreases make a very much longer list:—

	1915.	1914.
Cotton manufactures	£1,617,901	£1,920,945
Machinery	1,009,675	1,694,483
Apparel and slops	984,859	1,463,529
Leather goods	694,896	896,000
Hardware and cutlery	490,577	983,093
Haberdashery and millinery	462,000	700,585
Woollen manufactures	458,211	510,356
Iron and steel manufactures	404,614	684,527
Flour	255,254	358,702
Wood and timber	269,901	546,010
Motor cars and parts	178,678	587,737
Furniture	160,270	330,051
Electric wire and fittings	135,000	293,000
Agricultural implements	100,292	232,557
Manures and fertilisers	84,178	121,271
Arms and ammunition	82,148	141,912
Railway material	54,616	132,843
Tobacco	54,934	112,010
Musical instruments	30,976	92,934
Jewellery	27,362	95,287

The fall in the imports of machinery, agricultural implements, wood and timber, manures and fertilisers, and electric appliances is specially noticeable, as it indicates the temporary suspension of developmental work in the Union. The heavy reduction in the introduction of motor cars, motor bicycles, and so forth, is doubtless an indication of the community's desire to forego luxuries for the present. On the export side of the account there are no new features to record. Exports for the month totalled in value £1,137,355, which of course makes a poor showing compared with the figures for July of last year, when an export valued at £4,785,000 was recorded. This figure, however, included gold to the value of nearly three millions sterling and diamonds valued at £870,000. In July last we exported diamonds to the value of £51,702 only, and figures as to the gold export are not available.



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The Week's Meetings.

TRANSVAAL GOLD MINING ESTATES.

Presiding on September 17 in the board-room, Corner House, at the annual meeting of the Transvaal Gold Mining Estates, Ltd., Mr. Samuel Evans said:—I very much regret to say that your chairman, Mr. H. C. Boyd, is unable to be present owing to indisposition, and in his absence it falls to my lot to take the chair at this meeting. The directors' report and accounts, together with the technical reports, now submitted for your approval, have been in your hands for a considerable time, and afford very full information regarding the affairs of the company for the financial year ended March 31 last. In addition, you have since received the report for the quarter ended June 30. You will observe that last year's profits amounted to £219,369, as compared with £285,469 in 1913-14, £277,415 in 1912-13, and £205,104 in 1911-12. Although last year's results were disappointing, they were, as a matter of fact, better than those of any other year, excepting the two years immediately preceding the period under review. The profit earned in 1911-12 constituted a record up to that time. The main cause of the set-back in 1914-15 was the unprecedented rainfall which occurred in the latter part of the financial year. As the resident manager points out, the floods of January and February were the severest ever experienced in the history of the company, and they had a most disastrous effect on all mining operations.

Losses from Floods.

An idea of the extent of our losses from the floods may be gathered from the following comparison of the results obtained in the first nine and in the last three months of the year under review, to which I have added the results of the first five months and of August of the current year:—

	Monthly Averages. April 1 to Dec. 31, 1914.	Jan. 1 to Mar. 31, 1915.
Tons milled—		
Central Mines ..	12,353	8,400
Total	14,530	10,378
Gold recovered (fine oz.)—		
Central Mines ..	7,453	4,516
Total	8,824	6,023
Revenue—		
Total	37,040	25,044
Per ton milled	50s. 11.8d.	48s. 3.1d.
Expenditure—		
Total	15.798	13,797
Per ton milled ..	21s. 8.9d.	26s. 7.1d.
Profit—		
Total	20,677	10,630
Per ton milled ..	28s. 5.5d.	20s. 5.8d.

	Monthly Averages. April 1 to Aug. 31, 1915.	August. 1915.
Tons milled—		
Central Mines ..	10,536	11,200
Total	12,602	13,250
Gold recovered (fine oz.)—		
Central Mines ..	5.709	6,072
Total	7,051	7,208
Revenue—		
Total	29,549	30,156
Per ton milled	46s. 10.7d.	45s. 6.2d.
Expenditure—		
Total	15,019	14,401
Per ton milled	23s. 10d.	21s. 8.8d.
Profit—		
Total	13.800	14,875
Per ton milled	21s. 10.8d.	22s. 5.4d.

I think it may be said that normal conditions have now been practically re-established, although the quantity of ore treated last month was still 1,640 tons lower than the tonnage milled in August last year.

Reduction in Yield.

Another factor which contributed to the decrease in our profits last year was the reduction in the yield per ton. For the normal months of the year—the first nine months—the grade recovered averaged 12.14 dwts. per ton as against 13.59 in 1913-14, 12.97 in 1912-13, and 12.67 in 1911-12. The yield still continues low, the average figure for the first five months of this year being 11.19 dwts. per ton. The distribution of reduced dividends, totalling 30 per cent. for the year, left us with an unappropriated balance, increased by some £3,000 to £105,050, after providing for the usual taxes, the net capital expenditure of £2,635 detailed in the directors' report, and about £1,008 more than the necessary amount of debentures which fell to be redeemed during the period. During the current year it will probably be necessary to draw debentures for redemption, as we have not recently been able to effect any material purchases.

Shareholder's Question.

At the meeting of shareholders held in London, Mr. A. D. B. Marsh asked how it was that the Central Mines ore reserves had decraesed in value, seeing that the ore mined during the year was much below the average estimated value of the reserves. I may mention that the ore reserves at the Central Mines were valued at 14.4 dwts. at the 31st March 1914, and at 13.3 dwts. at the 31st March, 1915, and that the actual value of the ore crushed in the course of the year was 12½ dwts. per ton, from which a recovery of 11.8 dwts. was obtained. As will be seen, Mr. Marsh's question involves two sets of discrepancies, viz., the difference between the actual yield and the estimated value of the reserves, and the difference between the estimated value of the reserves at the end of last year, and at the end of the previous year. It is not easy to give a satisfactory explanation of these discrepancies, because, as the chairman of the London meeting pointed out, the value placed on the ore reserves is only an estimate. Another consideration which has an important bearing on the actual results obtained is the fact that every year a considerable quantity of ore is milled which was not included in the ore reserves. This may or may not account for some of the difference between the actual yield called for last year. Then again, the rains and the floods may have rendered unavoidable the mining in certain areas of an undue quanttiy of waste. Further, the values placed on the reserves at the end of the previous year may have been somewhat high. That would also account—in part, at any rate—for the difference between the estimated value of the reserves at the end of last year and at the end of the previous year. Even on the Rand, where the formation is so regular, considerable discrepancies occur between the actual grade recovered and the gold called for by the estimated value of the reserves. In the mines at Pilgrim's Rest, owing to the irregularity of the formation, it is quite impossible to place an absolutely accurate valuation on the reserves. The best that can be done is only an approximation, and a difference of 6 per cent. one way or the other might easily occur. As I shall point out later on, the ore reserve valuation at March 31 last showed a reduction of only 6 per cent. as compared with the position at the end of the previous financial year. That is not a very serious decrease. It may be due to a severer method of estimating the values at the end of last year. The probabilities, however, are that it is due chiefly to the fact that we were not able to replace with equally valuable ore the tonnage exhausted during the year. I may say that the company's officials on the spot are, on the whole, of opinion that the ore developed in the past 12 or 18 months has been of a lower grade than the average of the ore reserves on March 31, 1914, and that that is largely the cause of the decrease to which Mr. Marsh has drawn attention. I regret I cannot give a more definite answer to Mr. Marsh's question, but I have done the best I can, having regard to the fact that the problem involves so many unknown factors.

Ore Reserves.

At the end of the year under review our ore reserves were estimated at 527,487 tons, with a value of 13.28 dwt. per ton, as compared with 493,468 tons, with a value of 14.13 dwt. per ton, at the end of the previous year; that is, the new estimates show an increase of nearly 7 per cent. in the tonnage and a decrease of 6 per cent. in the average value per ton, which, in the circumstances, may, I think, be considered satisfactory. The reduction in the estimated grade is at the Central Mines and Vaalhoek, whilst there is a slight improvement at Elandsdrift. During the current year the tonnage of the reserves at the Central Mines has decreased to a slight extent owing to the inevitable hampering of development work while the reclamation of the mine workings was in progress. This is really a matter of no moment, considering the large amount of the reserves, but, so far as can be ascertained, the average value of recent disclosures shows no improvement, and, while values alter with great rapidity in the class of ore with which we have to deal, it is possible, if there is not a change for the better, that there may be at the close of the present year a further decrease to be recorded in the value of the reserves. Every effort will be made to push on with development, and the mines are certainly now in a much better position for the continuing of exploratory work in search of new payable areas than at the beginnnig of the financial year.

Development Results.

As was indicated in the last quarterly report, the development results to the dip of the Dukes Hill South anr Peach Tree Mines have recently been disappointing, and there is no change for the better to record. The second main road in Peach Tree, which is referred to in Mr. Carter's report, is now down over 1,300 feet without disclosing any payable reef. It will be continued, however, in order to test the large amount of undeveloped ground lying to the dip. Owing to the duplication of reef over a fairly large area in Peach Tree itself a considerable tonnage of good value has been disclosed. At the Columbia Hill and Iota sections the results at present are not very satisfactory. This latter section is now being linked up with the tramway system. Satisfactory results continue to be obtained at the Theta. At Graskop, which was the mine most severely damaged by the flood, the reclamation work was extremely heavy, and it is only during the past two months that fair progress has been possible. Reef of average value and thickness is now being exposed. At Brown's Hill Mine, part of the workings of which only became accessible in May, development has been expedited, and satisfactory exposures have been obtained. This mine is also being connected with the tramway system. So far it has not been possible to resume work at Pilgrims Creek section. At Theta Extension the disclosures have been fair, but not quite up to those of last year.

Other Work.

Prospecting work is continuing at Darke's Gulley and Beta without further definite results so far. It has not yet been possible to resume work on Beta Extension, which lies some two miles south of the Beta workings. The testing work on the alluvial gold in Pilgrims Creek and the Blyde River was interrupted by the floods, and is only now beng resumed. It will probably be a considerable time yet before any defintie opinion can be formed of the value of the deposits which undoubtedly exist.

There is nothing of interest to report in regard to outside prospecting. Alluvial gold continues to be recovered from Finsbury, which will now be worked in conjunction with Nooitgedacht on the werf of which a mynpacht brief has been granted. The construction work at Vaalhoek and Elandsdrift is well advanced, and the additional plants should be in operation in the course of the next two months. The dewatering of a section of Vaalhoek has presented considerable difficulties. The development position of each mine has gone back to a small extent as a result of the flooding, but remains quite satisfactory.

War Tax.

As you are doubtless aware, a special war tax of half a million sterling has been levied on the gold mines. Our share of this will amount approximately to £10,000, which will be payable £5,000 on the 31st of December next, and the remaining £5,000 at the end of March, 1916. On the outbreak of war between Italy and Austria Mr. S. Aimetti, who is an Italian subject, felt it his duty to return to his country and offer his services in a military capacity. He, therefore, tendered his resignation as general manager, which the Board accepted with great regret. The value of the services which Mr. Aimetti has rendered to the company are best testified to by the records of the results obtained during the five years he was in charge of the company's affairs. Mr. R. A. Barry, till lately manager of the Nourse Mines, has been appointed general manager of the company, and Mr. R. C. Warriner, with the consent of the Board of the Crown Mines, Limited, has been appointed consulting engineer. The services of these two gentlemen cannot fail to be of the greatest value to the company in the further successful exploitation of its property. Unless shareholders indicate that they wish it still to be issued, we propose to abolish the report for the quarter ended the 31st of March each year, as the annual report is available about a couple of weeks later and naturally affords much fuller information. By the change unnecessary work and expense would be avoided.

The report and accounts were adopted.

Colonel Sir Aubrey Woolls-Sampson, K.C.B., and Mr. Nicol Brown were re-elected to the directorate.

Messrs. Howard Pim and Hardy and Charles Stuart were reappointed auditors.

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CONTENTS.

PAGE
Notes and News ... 95
Topics of the Week:
  A Review of the Industry ... 97
  The Miner in War ... 98
  Relief Work in Belgium ... 98
The Mines, their Employees, and the War ... 99
The Year with the New Modderfontein ... 100
Losses in Tin Recovery ... 101
The Position of the Nourse Mines ... 102
Is Rand Mine Ventilation Inadequate? ... 103
The Market for South African Asbestos ... 105
Yield, Costs, and Profits in August ... 106
Metallurgical Practice on the Rand—VII. ... 107
Stoping Methods and Drilling Problems on the Witwatersrand—II. ... 108
Rhodesian Section:
  Rhodesia Mineral Output for August ... 109
Correspondence and Discussion: "The Geological Museum"; "Dr. Mellor's Rand Geology" ... 112
The Week in the Sharemarket ... 113
Mine Safety, Sanitation, and Welfare Bulletin: Miscellaneous Mine Accidents—IV. ... 114
The Week in the Mining Material and Engineering Trades ... 115
Engineering Notes and News ... 117
  The Trend of Electrical Development ... 117
The Week's Meetings: Simmer and Jack, Sub Nigel, McCreedy Tins, Coronation Syndicate, Coronation Collieries, Tavistock Collieries, Kleinfontein Township, Afrikander Proprietary Mines, New Boksburg 121

Notes and News.

Geduld Extension of Reduction Plant. The secretary writes:—I am directed to hand you the following notification for publication, viz.:—"My board of directors have decided to increase the capacity of the reduction works immediately to enable it to crush 40,000 tons per month. The increase will be so made as to permit of a still further addition at a minimum expenditure and development will be continued at full speed with this end in view. It is expected that the increased plant will be in operation before the end of next year. The expenditure will not interfere with the payment of dividends as the necessary funds are in hand."

* * * *

Main Reef West. A cable has ben received from the London secretaries advising that at the meeting of Debenture Holders, held in London yesterday, the resolution agreeing to the postponement for three years of the annual redemption of debentures had been passed unanimously. This, of course, will not interfere with the half-yearly payment of interest.

* * * *

Village Main Reef. The secretaries write, under date of September 28th:—We beg to inform you that the following cable has been despatched to London: "Several earth tremors experienced in Johannesburg last night and this morning. H. Stuart Martin just returned from mine reports about 2 a.m. main and incline shafts crushed between 9th and 10th levels. Falls of rock occurred in both stations and crosscuts. All shaft timber having collapsed between these levels damage to vertical and incline is considerable. Considerable quantity of rock will have to be cleared. Extent of damage to pipe columns and cables cannot be estimated at present, but Village Deep will deal with all water. Pump chambers and underground engine rooms are alright. No whites injured, three natives killed and eight injured. Organized repair work now being undertaken will probably take three weeks to completely repair shafts. September profits will not be affected. Will report by cable fully when underground examination completed."

* * * *

Copper and Tin Returns. South Africa's sales of copper during August were valued at £160,904, to which the Cape contributed £125,278 and the Transvaal £35,626. Tin sales during the same month came to £25,048, of which the Transvaal's share was £25,000 and that of the Cape £48. Union sales of previous months are as follows:—April: Copper, £230,689; tin, £18,784. May: Copper, £17,610; tin, £27,093. June: Copper, £36,977; tin, £31,194. July: Copper, £44,870; tin, £22,733. August: Copper, £160,904; tin, £25,048.

* * * *

What the Mines Pay. The mines of the Rand paid £3,511,534 in wages to their white employees during the first six months of this year and the gold mines outside the Rand £151,386. The amount paid on the Rand was divided as follows: Technical staff, £359,467; clerical staff, £181,165; other white employees, £2,970,902. Special payments made to or on behalf of white employees on active service as far as mines of the Rand were concerned were as follows: Technical staff, £5,475; clerical staff, £4,310; other white employees, £38,858.

* * * *

The Red Cross. The last *Government Gazette* issued notifies that His Excellency the Governor-General in Council has been pleased, under the Geneva Convention Act, 1911, as applied to the Union of South Africa, by the Geneva Convention Act Order in Council, 1913, to grant authority to the Central Good Hope Red Cross Committee, Capetown, and the South African Red Cross Society, Johannesburg, to use for the purpose of their Committee or Society, as the case may be, the heraldic emblem of the Red Cross on a white ground, formed by reversing the Federal colours of Switzerland, or the words "Red Cross." Similar authority has been granted to the Red Cross, South Africa, which is a deferation during the present war of the two before mentioned bodies.

* * * *

Sakalava Oil.

The secretary of the Sakalava Madagascar Proprietary Oil Fields, Ltd., writes: The following is an extract from correspondence received from Mr. G. M. Robinson, manager of the company, bearing date 6th August, 1915—namely: *Re* No. 3 Well.—"From the formation we are going through at present there is every indication of a big body of oil in the vicinity. If we should not strike it in this well, we won't have far to go, as there are the best indications here I have ever seen, and I have been in the oil business for 20 years. At the time of writing the well had reached a depth of 1,300 feet, the formation then being lime and sand." Since then we have received the cable published on the 3rd September, 1915, stating the well had been drilled to a depth of 1,550 feet with show of gas oil. Messrs. Stewart and Taylor, directors of the company, have now returned to Johannesburg after an extended stay in Madagascar, and would be pleased to see any shareholder at the office of the company by appointment. Samples of the crude oil from No. 2 Well are on view at the office.

* * * *

Chemists for Overseas Munitions Work.

Mr. F. Rowland advises us that tentative applications only are invited for the vacancies for chemists in overseas munitions work. He has been requested from London to ascertain whether suitable chemists were available for service overseas if required—those with previous experience with explosives preferred. No other details are available at present, except that the remuneration may be at the rate of £120 to £350, the latter amount for those appointed to senior positions. Applications must be clearly written on one side of the paper only, and must be made in the following order:—(1) Name; (2) address; (3) age; (4) short summary of training in chemistry and positions filled; (5) copies of, say, three recent references. The applications will be sent either to England, or will be dealt with here, as may be found necessary when further particulars are received. As soon as anything definite is known one way or the other, applicants will be advised.

* * * *

A Fillip to South African Engineering.

The following has been officially communicated to the Press by Defence Headquarters:—In consequence of numerous offers and suggestions as to the local manufacture in the Union of munitions of war or their component parts, steps have been taken to ascertain to what extent local manufacture might be feasible as a practical means of giving effective assistance to the Imperial Government. The Minister of Munitions, who has at his disposal in England the advice of several South Africans with an intimate knowledge and practical experience of South African conditions and resources in engineering and the manufacture of explosives, has authorised the statement that except in supplying certain articles for which arrangements have already been made, the Union can render the most effective assistance by performing locally all engineering work which it is possible to undertake in the Union to meet its own requirements. This will materially relieve the workshops in the United Kingdom for the future production of war munitions. The Union Government is therefore inviting the representatives of South African industries concerned to consider immediately what is the greatest possible extent to which South Africa can assist the Imperial Government by thus relieving for munitions manufacture the workshops of the United Kingdom. When that has been ascertained, but not till then, it will be possible to determine how many skilled workmen can be spared from the Union and given special facilities to go overseas for employment in the munition factories of the United Kingdom. The Minister of Munitions will then gratefully accept the services of any such skilled workers as can be spared from the Union, and arrangements will then be made for selecting and forwarding them to England. The foregoing speaks for itself, and should have a stimulating effect on local engineering industries. We shall return to it in our next issue.

* * * *

Stock Exchange Values.

The past month has been a quiet and for the most part a dull one on the Stock Exchange, states the *Bankers' Magazine* in its usual review of Stock Exchange values. Indeed, dealings, so far as home stocks are concerned, may be said to have centred in the new War Loan, which, of course, is not included in the present list of selected stocks. Considering the gigantic size of the loan, the price may be said to have been fairly well maintained, though it must be remembered that the present price of 98 or so carries a good deal of accrued interest. The monthly valuation is based upon official markings of actual business done, and that means that the decline in values is partly explained by the fact that dealings have occurred during the month in this or that particular stock for the first time for a long while past. On balance, however, the net movement for the month is not very great, the decline in many departments being offset by a striking advance in one or two sections. On the whole, the representative list shows a decline of £2,898,000, the exact figures being as follows:—Aggregate value of 387 representative securities on 20th July, 1915, £2,909,989,000; 21st August, 1915, £2,907,091,000. The most striking exception to the general decline in values was in the case of railways in British possessions and American Railroad shares, where there is an advance to note of no less than 5·2 per cent. and 4½ per cent. respectively, while American Gold bonds also improved materially. This must be ranked among the good features of the month in view of the importance which attaches to holdings of American securities commanding a good price at the present time.

* * * *

Handling Ore in Stopes.

One of the most inefficient, if not the most inefficient operation, connected with mining on dips of 25 degrees to 33 degrees is the removal of broken ore from the stopes, for the following reasons: (1) The work is carried out by unskilled natives, whose main object is to get through the shift with as little exertion as possible. (2) The work is difficult to regulate and supervise, when, for instance, some ten natives are shovelling near one another in some part of a stope, it is almost impossible to so place them that all work to the best advantage, and the result is that instead of each native lifting the rock and throwing it as far as possible, he only scrapes it along the foot-wall into the shovel to the native immediately below him. These two points were made by Mr. W. Weinbren at a recent meeting of the Chemical and Metallurgical Society. It, therefore, follows, Mr. Weinbren asserted, that if excessive shovelling can be avoided the removal of the broken ore will become more efficient. With this object in view the following system was introduced at one of the mines on the Rand. A permanent line of chutes was laid down at a safe distance from the faces of the stopes, in many cases one line being sufficient for both faces. Each line of chutes was given a uniform grade, so that the rock should go from the very top of the stope right into the box without choking the chutes or jumping out of them. Tracks of one foot gauge were put in at approximately every 50 ft. along the dip of the stopes, and running from the faces to the chutes. A special type of truck was designed. It was very light, and could, therefore, be easily placed in a position of safety, behind some waste pack, at the end of the shift. The truck had a capacity of five cubic feet, and as the total heights is only one and a half feet from the rails, it could be handled quite comfortably in most stopes. After the system was introduced, Mr. Weinbren pointed out that in one stope the number of shovellers was reduced by 50 per cent., and yet the stope was kept cleaner than it was before. The system consisted of permanent chutes and tracks running from the face to the chute, roughly, every 50 ft. on the dip, and specially designed trucks to overcome the difficulty of small stoping widths, and the advantages claimed for it were: (1) By having permanent chutes no time is wasted at the beginning and end of the shift in putting up and taking down these. (2) Gravity is made to assist as much as possible. (3) Instead of having boxes every 20 to 30 feet, they are only necessary every 60 ft. and 70 ft. (4) Better supervision is possible. (5) A good idea can be obtained of how much each native actually does.

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Mining Activities Round Leydsdorp.

A correspondent of the *Zoutpansburg Gazette* writes:—There is more activity in the Leydsdorp district to-day than there has been for many years past. The railway, combined with the high price of antimony, are great incentives to work the many rich gold and base metal claims known to be in the district. The machinery and work put into the United Jack speaks volumes for the enterprise of those controlling the destiny of this promising enterprise, which started its machinery during the present week, and the word has been passed that it works very satisfactory. The Sutherland Reef tailings yielded a very satisfactory amount of gold last month. The property is part of the Harmony Estate, and it is expected the mill will be restarted shortly now—indeed it would be a great shame if what is generally acknowledged to be such a good property were allowed to remain idle any longer. The prospectors now at work on the Harmony Estate are making some good finds of gold quartz, and these will have attention at an early date, but meantime the prospectors are concentrating their attention on finding antimony on the Harmony Estate, which indications give them great hopes of doing before they drive many feet further. Shealite, worth hundreds of pounds per ton, has been found on Government ground near the border of the Harmony Estate. The Messrs. Munnik are transporting crude antimony, and rumour says the Gravelotte mine is likely to re-start and that the African Farms have secured a very large number of valuable claims so there are many indications that the locality is in for the good time it deserves.

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Willoughby's Consolidated.

The Willoughby's Consolidated Company, Ltd., must be deemed lucky to have had an income of over £70,000 last year, which compares, however, with nearly £81,000 in 1913. The credit balance on the year's operations was £9,850 (against £15,725), which, with the amount brought forward (less income tax), makes a total available balance of £31,300. It is proposed to transfer £8,500 to the reserve account and to carry forward £22,800, against £23,300 brought in, consequently no dividend is paid for 1914. The sum of £75,000 has been taken from reserve and written off the investments in consequence of the heavy depreciation and the change in market conditions which has occurred owing to the war. Nearly 16,000 acres of the company's land were sold during the year at 15s. 9½d. per acre, against just over 14,000 acres at 14s. 11d. per acre in 1913. The directors point out that the general position of Rhodesia at the present time has been far less affected by the war than might have been expected. The large mines have not suffered. The drought of the past three years has been followed by exceptionally heavy rains which have completely altered the outlook of the farming community. General business has naturally been quiet, but the railway returns have lately shown improvement and, so far as can be foreseen, there is no reason to expect a return to the conditions which prevailed in the autumn of last year.

TOPICS OF THE WEEK.

A REVIEW OF THE INDUSTRY.

Several excellent features marked the quarterly review of the President of the Chamber of Mines this week. He was able to point to an unexpectedly good labour position, a splendid increase in the year's output so far, and a certainty of adequate supplies being maintained, if at slightly increased prices. In regard to native labour, Mr. Dawe said:—"It is gratifying at this season of the year to be able to record that the position is quite satisfactory. At the end of May last the gold mines were employing 183,961 natives, while at the end of August the number had risen to 196,866, thus showing an increase, during the three months when it is least expected, of 12,905 natives. At the last quarterly meeting of the Chamber I expressed the opinion that the figures at the end of August would show but a slight decrease on those as at the end of May, but the results of recruiting have altogether exceeded the estimate on which that opinion was based. Now that the winter is over, our advices are to the effect that, unless unforeseen circumstances should arise, the prospects of a continued adequate supply of labour are most favourable. The supply of East Coast labour, which is so important to the industry, has been so good for the first eight months of this year that there is every prospect of the year 1915 being a record one in this respect." Regarding the question of mining supplies and the steps necessary to maintain sufficient stocks at reasonable prices, Mr. Dawe said that the very large amount of Government work now being undertaken by the factories in the United Kingdom had naturally entailed some retardation in the execution of orders for the mines, and also a limitation in the quantities of the ingredients for explosives that might be accumulated in this country. In every instance, however, the representations made on behalf of the mining industry to the Imperial Government had been sympathetically received, and it was, he thought, certain that the work of the industry would not be interfered with through a cessation of supplies, however much it might suffer through unavoidable increases in the cost of such supplies. He added: "So far as cost is concerned, it is only natural that prices should advance, and I am afraid that we must expect still further advances in the future. Your Executive Committee and the central buying committee carefully watch the price position, with a view to ensuring that the industry does not suffer through prices being unduly increased in any line, and they are satisfied that, generally speaking, prices are being maintained at a fair level. In view of the great increases that have taken place in the prices of cyanide and zinc, the Chamber recently instituted inquiries by a committee of consulting metallurgists into the possibility of effecting economies in the use of these articles by the mines. As regards cyanide, an exhaustive investigation has shown that the extent to which economies can be effected is apparently small, while as regards zinc the completed results to date only indicate a possible saving through the utilisation of by-products—which to be of practical importance requires the persistence of very high prices for zinc-bearing material." Mr. Dawe went on to show that by reason of the satisfactory supply of native labour the gold output of the Transvaal is steadily improving, the output for August being the highest since May, 1913, and it appears likely that the total output for the current year will approximate to the highest year's output yet recorded, that for 1912, which amounted to £38,700,000. Profits have not kept pace with the increase in the output. Although the output for the year has increased to date by £1,800,000, the total working profit has remained practically stationary, while the working profit per ton has shown a material reduction. In other words, the increase that has taken place in the output has been counterbalanced by a corresponding increase in the total working costs. The President also announced that in collaboration with the Miners' Phthisis Prevention Committee, the Chamber is printing a poster which will show in a graphic form the effect of the efficient use of dust-allaying provisions on the amount of dust in mine air. The effect of such use, as set out in the poster, is very striking. For example, in the case of blasting, the number of particles of dust breathed per minute is reduced by the use of the water-blast from 2,450 millions to 10 millions, while in the case of drilling with piston drills a reduction of 330 millions to 12 millions is accomplished. Besides showing the importance of the use of water, the figures set out in the chart also afford some indication of the improvements that have taken place in dust conditions on the mines since dust-allaying appliances were provided and their use insisted upon. "The reason for publishing this diagram is the desire to impress everyone connected with mine workings with the necessity of assisting, by all means in their power, to see that the appliances provided are properly used and the regulations observed." Many other matters of importance were dealt with by the President, but the foregoing extracts cover his remarks on the outstanding questions of native labour, the output, supplies, and the phthisis evil.

THE MINER IN WAR.

The interesting reference by the President of the Chamber of Mines on Monday to the generous provisions being made by the mines for those who can be spared for active service again draws attention to the coolness and other excellent qualities of the miner as a fighting man. It is quite evident that the miners have proved their right to share in the general distinction that British workers have achieved in this war. The record of the coal miners is strikingly summed up by Mr. Lloyd George in his speech on the question of munitions delivered in the House of Commons on the 23rd June last, from which the following extract is quoted:—"The way in which the miners have come forward to enlist in our armies voluntarily is one of the most conspicuous exhibitions of patriotic sacrifice that has been exhibited by almost any trade in the country. I believe that about 224,000 of them are enrolled in our armies at the present day, and I was told by men whom I have seen at the front that no men have exhibited more desperate valour under trying conditions than the miners who have come from different parts of the country." The rate of enlistment among the miners of Britain has been authoritatively quoted as being 10 per cent., and it was found necessary in some of the colliery districts to discourage recruiting because of the consequent disorganization of the industry. The greater willingness of the married men to enlist has been characteristic of the recruiting among miners in Great Britain. This may be partly explained by the fact that the miner as a rule marries early in life. There is also, maybe, a subtler reason, and one that finds its source in the psychology of the miner's wife. The bravery of the miner's women folk needs neither emphasis or encomium to those who know them intimately, and in any meed of praise justly given to the miners of the Empire for their ready and willing response to recruiting appeals in every corner of the Empire, the brave part played by the miner's wife must not be forgotten. The work of the miner develops certain characteristics that peculiarly fit him for the trench warfare that has played so great a part in the fighting in Flanders. One officer, in speaking of the miner's battalion, stated that the miner made a good soldier because of his ability to withstand cold and damp and fatigue, because of his "strong back," his understanding of excavation and the nature of ground, his familiarity with explosives, his "curious ear" for suspicious sounds, and his general contempt for danger. This officer remarked that miners did not make "parade soldiers," particularly in the case of the older men whose figures were set, but he did not think that the Germans had noticed the difference. In the matter of listening the miner should excel, as under working conditions his life will sometimes depend on his ability to correctly diagnose the meaning of sounds in the roof and timbers.

RELIEF WORK IN BELGIUM.

The fact that to Mr. W. L. Honnold has fallen the honour of succeeding another distinguished American mining man, Mr. H. C. Hoover, as head of the Commission for Relief in Belgium, lends additional interest to the extraordinarily engrossing report of that body, just issued. The tale of desolation and destitution is told in the soberest language; but it is a moving story. In Belgium 7,000,000 are dependent on the Commission for food; of these 2,750,000 are in absolute poverty and want, and 500,000 have been kept above the destitution mark by the Commission's financial operations. In the North of France 2,285,000 people are now looking to the Commission for sustenance. But in reading the report it is possible almost to forget the sorrows of these unhappy victims in admiration for the splendour of the Commission's work. Mr. Herbert Hoover, who has sacrificed his whole time and devoted all his energies to the task, bears testimony to the generosity of the subscribers, to the services rendered freely by commercial and transportation agencies, and to "the whole-hearted co-operation of, literally, scores of thousands of volunteer workers." The co-ordination of this mass of effort has been due principally to Mr. Hoover himself, and no acknowledgment of his labours can be too warm. After all that has been done Mr. Hoover is far from satisfied. He points out that though the Commission is spending £1,000,000 a month, this sum divided over those now unemployed and destitute averages less than 2½d. a day. "It can be said emphatically that no human being can be kept alive even in Belgium, with the most rudimentary food and clothing at war prices, on a less outlay by somebody somewhere of between two and three times this amount." He judges that the Commission's work has only supplemented individual resources, and as these must diminish as the war goes on, additional support will have to be forthcoming. The Commission's work is divided into three functions. First, it has to provision the entire population, and up to the end of June 600,000 tons of foodstuffs had been imported, of a value of about £9,400,000. These are sold to people able to buy, and the profit is devoted to the relief of the destitute. The profit to June amounted to £987,000, and represents the free services rendered in the purchase and transportation of the food. The second function is in the hands of the Financial Relief and Exchange Department. All the food sold is paid for in Belgian paper money, which is inconvertible into gold. How to get the money out of Belgium to pay for food purchases was a serious problem; but it was solved, with the assent of the belligerent Governments. "Persons or institutions abroad who wish payments made in Belgium can now hand to the Commission gold values in Rotterdam, London, or New York, and the Commission undertakes to make payments of corresponding sums in Belgium" out of the paper currency receipts. "There does not therefore pass over the frontier any actual money or securities of any kind, as the foodstuffs imported act as the implement of exchange." Altogether the report is a splendid record. Mr. Hoover concludes by saying, "the fact that the work should be continuing with increasing efficiency ten months after its inception is a surprise to its members, and is in itself not only a testimony to the forbearance of both the antagonistic Powers, in matters of principle as well as in matters of detail, but is a monument to human devotion." The surprise of the Commission is not at its efficiency, but that it has been able to go on in face of the obstacles. "The bare question as to which of the belligerent sides has the legal and moral responsibility of feeding a civil population in this position of unparalled human experience, the military aspects involved in the economic weapon of food supply, its transfer through war zones and belligerent frontiers, its distribution, and the necessary transactions involved therein, have been of the greatest importance from the point of view of the combatants. All these transactions have been subject to the most jealous supervision by both sides." The Commission has effected wonders in making its own work possible, and those who criticise American non-intervention in the war omit to notice that American neutrality and the self-denial of individual Americans alone made possible the noble task of helping suffering Belgium.

THE MINES, THEIR EMPLOYEES, AND THE WAR.

Generous Terms—"Vital Importance of the Industry"—Treatment of Volunteers and Apprentices.

The President of the Chamber of Mines made an important statement regarding the treatment of mine employees volunteering for active service, at the last meeting. He said, *inter alia*:—"I am sure you will approve of the action taken by your Executive Committee in connection with the mine employees who are volunteering for military service in Europe. When it was announced that South Africa would provide an Expeditionary Force it was decided by the gold-mining companies represented on the Executive Committee of the Chamber that in cases where their employees volunteered for active service with the consent of their employers, their situations would be kept open for them, and that the married men would receive half-pay. More recently your Executive has had under consideration the case of single men without dependents. It was thought that the contingent should consist chiefly of unmarried men; on the other hand, it was felt that to men accustomed to South African rates of pay the Imperial rate of pay, of one shilling per day, offered insufficient inducement. Your Executive therefore decided that in the case of the volunteer being a single man, without dependents, he should receive quarter-pay, in addition to the present Imperial rate of one shilling per day, so long as that existing rate of pay continues. In regard to cases of single men having relatives dependent on them, no hard and fast rule has been laid down, but where such men have volunteered with the consent of the management concerned, their cases have been considered on their merits, and where the circumstances warrant it, an amount in excess of quarter-pay has been granted. It may be that when the new Union Parliament meets the Imperial rate of pay may be supplemented by the Union Government, in which case the question of the allowances made by the mining companies will be reconsidered. The number of applications which the mining companies have received from their employees for permission to volunteer for the Overseas Contingent has been large. In some cases it has not been possible to grant the permission asked for; and in regard to this point I may be excused for again referring to the fact that the importance of the mining industry to the Empire is so great that we can run no risk of interfering with its steady operation. An instance of the vital importance of the South African gold in the cause of the Allies has lately been in evidence through the heavy fall in the American exchanges. You will have observed from the Press cables that, while arrangements are being made for the establishment in America of sufficient credits to adjust the adverse balance of trade in regard to ordinary commodities, the large orders for munitions of war placed by the Allies will not be financed by the American banks, but will be paid for to a considerable extent in gold. The continuance of the necessary gold payments is only made possible by the fact that the British Empire produces sixty millions pounds sterling in gold per annum, thirty-eight millions of which is produced by the Transvaal. Another question which is dealt with in the report is the position of apprentices who served in the German South-West campaign. Many of the gold mining companies' apprentices volunteered for military service with the consent of their employers, or were called out under the Defence Act, and your Executive has had under consideration the question as to how far the time spent on active service is to affect the terms of the apprentice's indenture. The question is not free from difficulty. On the one hand, your Executive is anxious that apprentices should suffer as little as possible under the terms of their indenture by reason of their being on active service; on the other hand, it is essential to ensure sufficient training of the apprentices in their particular trades. After due consideration your Executive arrived at the decisions set out in the report—namely, that time on active service is not to count towards the completion of the period of an apprentice's indenture, but, on the other hand, his period on active service shall count towards the increments of pay, and in the case of apprentices proceeding on active service in the last year of their apprenticeship, the increment of pay shall continue after that year, in the same ratio as is laid down in the indentures.

Wolhuter Gold Mines.

The report for the quarter ended 31st July, 1915, shows *inter alia*:—Total working costs, £86,797 11s. 7d., or 16s. 2·686d. per ton milled; profit for quarter, £41,548 19s. 4d., or 7s. 9·194d. per ton milled; revenue, £128,346 10s. 11d., or 23s. 11·880d. per ton milled. Note.—No allowance has been made in the above statement for the Government tax on profits. The capital expenditure was as follows:—Shafts, £3,121 6s. 11d.; buildings, machinery and plant, etc., £1,460 4s. 10d.; total, £4,581 11s. 9d. Approximate tonnage sent to crusher house, 124,365 tons; waste sorted out (13·963 per cent.), 17,365 tons; in mill ore bins, 1st May, 1915, 1,400 tons; total, 108,400 tons; tons milled, 107,000 tons; in mill ore bins, 1st August, 1915, 1,400 tons. Milling: Number of stamps running, 120; total time run, 87·850 days; tons milled, 107,000 tons; duty per stamp per day, 10·150 tons; assay value of ore milled, 6·143 dwts.; yield in fine gold, 22,419·974 ozs.; yield per ton milled, in fine gold, 4·191 dwts. Cyaniding: Tonnage treated, 107,000 tons; yield in fine gold, 8,333·111 ozs.; yield per ton milled in fine gold, 1·557 dwts. Recovered from all sources, 30,753·085 ozs., equal to 5·748 dwts. fine gold per ton milled. Footage developed. East shaft, 2,331 feet; west shaft, 852 feet; mynpacht, 134 feet; total, 3,317 feet; shaft sinking (west shaft), nil—total depth of shaft, 3,747 feet; shaft sinking (east shaft auxiliary), 69 feet—total depth of shaft, 823 feet. Footage sampled:—East shaft: Footage sampled, 2,076 ft.; average reef width, 22·33 ins.; average reef value, 9·59 dwts.; average stope width, 51·7 ins.; average stope value, 4·1 dwts. West shaft: Footage sampled, 672 ft.; average reef width, 30·61 ins.; average reef value, 11·68 dwts.; average stope width, 55·5 ins.; average stope value, 6·4 dwts. Mynpacht: Footage sampled, 110 ft.; average reef width, 25·59 ins.; average reef value, 8·73 dwts.; average stope width, 50·0 ins.; average stope value, 4·5 dwts. Total: Footage sampled, 2,858 ft.; average reef width, 24·40 ins.; average reef value, 10·17 dwts.; average stope width, 52·6 ins.; average stope value, 4·7 dwts. Tons developed or exposed during the quarter (includes ore mined from development):—Estimated payable tonnage: East shaft, 40,365 tons, assay value 5·65 dwts., over 54·9 ins.; west shaft, 22,435 tons, assay value 8·75 dwts., over 49·3 ins.; mynpacht, 6,596 tons, assay value 4·90 dwts., over 50·0 ins.; total, 69,396 tons, assay value 6·60 dwts., over 52·5 ins. Estimated unpayable tonnage: East shaft, 23,920 tons, assay value 2·46 dwts., over 56·0 ins; west shaft, 13,660 tons, assay value 3·04 dwts., over 59·0 ins.; total, 37·580 tons, assay value 2·67 dwts., over 57·1 ins. The payable ore reserves at date are:—884,937 tons valued at 5·99 dwts. over 53·5 ins. The machinery and plant continue in good working order.

Swaziland Tin.

The following are the particulars of this company's output for the month of August, 1915:—Concentrate recovered, 33·048 long tons; estimated profit (taking the price of tin at £140 per ton), £757; to which must be added (being adjustments in respect of previous shipments), £245; total, £1,002.

THE YEAR WITH THE NEW MODDERFONTEIN.

Notable Increase in Profits—Enlarging the Capacity—Development of Circular Shaft Section.

THE working profit earned by the New Modder in the year ended June 30 last amounted to £683,450 9s. 4d., to which must be added £20,419 11s. 1d. in respect of interest, freehold revenue and liquidated damages received from the Rand Mines Power Supply Company, Ltd., and £11,743 6s. 9d. deducted for expenditure in connection with donations and contributions under the Miners' Phthisis Act (Compensation Fund), leaving a balance of £692,126 13s. 8d. to be carried to appropriation account. This sum, with the balance of £230,114 3s. unappropriated at the commencement of the year, and £177 5s. 11d. in respect of dividends which have been unclaimed for five years, and are now forfeited for the benefit of the company, gives a total of £922,418 2s. 7d., which has been dealt with as follows:—Expended on capital account, £38,772 4s. 1d.; Government taxes, £92,963 6s. 7d.; dividends, £437,500; total, £569,235 10s. 8d.; leaving a balance unappropriated, represented by cash and cash assets, less all liabilities, of £353,182 11s. 11d. It will be seen that the whole of the working capital subscribed in April, 1910, has now been expended, and that future expenditure on capital account will have to be met out of profits. A special war levy on the mining industry of £500,000 has been made by the Union of South Africa in respect of its financial year ending 31st March, 1916. This tax, which will be distributed amongst gold mining companies *pro rata* to the amount paid by them under the Mining Taxation Act, 1910, during the same period, cannot be accurately ascertained until all returns are made to the Government in this respect. Provision has been made in the balance sheet for the estimated assessment under the Act, amounting to £30,000, which sum has been charged to appropriation account in the accounts now submitted. The amount of the tax is payable as regards 50 per cent. thereof on or before 31st December, 1915, and the balance by 31st March, 1916. The total amount expended on development during the year amounted to £61,421 10s. 10d., of which £30,846 10s. 10d. have been charged to capital account for development and £30,575 to working costs. This latter sum is based on a charge of one shilling per ton milled and fully covers the cost of development in respect of the tonnage mined. The results for the period covered by this report have been affected by the European war, a rebellion in the Union of South Africa, and by the raising of a military force for the conquest and occupation of German South-West Africa. In common with other large employers of labour, the company allowed half-pay to married men in its service who enrolled for military duty, and assisted the dependents of single men. The same allowances have been extended to men who volunteer for active service with the Overseas Contingent being raised. The war has also been responsible for advances in prices of general mining supplies. It will be noticed that the value of stores on hand has considerably increased. This is due to the laying in of large stocks of stores which are essential to the continuation of mining and milling operations. The gold produced is being realised under arrangements made with the Bank of England. Mr. H. Stuart Martin, the consulting engineer, writes:—

> The main features of the year's operations, compared with the previous two years, show satisfactory improvement, as follows: Tons milled: Year ending June, 30, 1913, 565.40 tons; year ending, June, 30, 1914, 510,300 tons; year ending June 30, 1915, 611,500 tons. Yield per ton milled: Year ending June 30, 1913, 39s. 7d.; year ending June 30, 1914, 38s. 10d.; year ending June 30, 1915, 38s. 3d. Costs per ton milled: Year ending June 30, 1913, 19s. 11d.; year ending June 30, 1914, 16s. 11d.; year ending June 30, 1915, 15s. 11d. Profit realised: Year ending June 30, 1913, £559.243; year ending June 30, 1914, £559,487; year ending June 30, 1915, £683,451. The reduction plant has been operated to practically its full capacity throughout the year, with the result that the profit obtained has shown a notable advance over any previous year. The satisfactory yield has been obtained from a mine grade lower than in the past year, closer attention to the elimination of waste rock, referred to in my last report, having had a beneficial effect on the value of ore sent to the mill. The increased scale of operations has acted in favour of working costs, though it has to some extent been counterbalanced by the effects of closer sorting, expenditure on renovations to the stamp mill, and to the higher cost of stores and material brought about by war conditions. The total development footage accomplished amounted to 18,142 feet; of this, 8,780 feet can be regarded as special development for the section commanded by the circular shaft, i.e., from the 11th level downwards. The reef disclosures have been on the whole all that could be expected, as good results are not looked for in the zone immediately east and west of the line of No. 12 incline shaft, where a comparatively narrow and poor zone has hitherto invariably been encountered. There has been a distinct improvement shown as the drives have been extended and approach zones in whose neighbourhood good results have hitherto been obtained. The payable ore reserve, excluding all ore partially blocked out below the 10th level (Circular and No. 12 shafts), after re-valuation and re-measurement, is as follows:—Main Reef: Block ore—5,606,000 tons, value 8.24 dwts.; shaft and boundary pillars—281,800 tons, value 7.46 dwts; total—5,887,800 tons, value 8.20 dwts. South Reef: Block ore—113,000 tons, value 5.80 dwts; shaft and boundary pillars—10,000 tons, value 6.70 dwts; total—123,000 tons, value 5.87 dwts. Totals and averages: Block ore—5,719,000 tons, value 8.20 dwts.; shaft and boundary pillars—291,800 tons, value 7.44 dwts.; total—6,010,800 tons, value 8.15 dwts. The above figures are based on stoping widths averaging 62.5 inches in the Main Reef and 58 inches in the South Reef. Compared with last year, the value of the block ore is 0.2 dwt. lower, due to the closer valuation of several large blocks in No. 12 shaft section, which have, during the year, been more completely developed by winze and raise connections. The tonnage of ore in reserve is also shown at a slightly smaller figure than last year. This is explained by the fact that last year some ore partially blocked out in the circular shaft section was included in the ore reserves and has this year been excluded. It is considered that on the whole the development at the circular shaft requires further detail work to provide additional information; until this is completed it cannot be valued with any degree of accuracy. The work planned for the current year will provide the data required. The tonnage of ore partially developed in the circular shaft section totals just over one million tons. Apart from the linear development on reef, a large amount of work has been done in connection with the permanent underground arrangements. In the upper section of the mine, which for many years will be the ore producer for the existing reduction plant, many improvements have been taken in hand. The most important has been the completion of the haulage arrangements on the 8th or main level, which has made it possible to economically transport ore from the extreme eastern and richer section of the mine. The steps that have been taken to enlarge the capacity of the mine have been as follows: On the surface, at the head of the circular shaft, the steel headgear is practically finished, a substantial engine room has been completed, one compressor erected, together with the electrical portion of the large hoisting engine. The transformer house and the general surface arrangements to the doors of the proposed reduction plant are, with the exception of minor details, all in readiness. Underground, as already stated, large areas have been partially developed, and during the current year a number of additional stope faces will be available for working. At the shaft bottom an underground crusher station has been built; excavations for the main pumping plant, pump room, sumps and clarifiers are well in hand. The capital expenditure for the year has been heavy, and is scheduled in detail in the manager's report. It has been spent mainly on advance development and general equipment at the new shaft. It is estimated that during the current year a further £55,000 will be expended on development, and £75,000 to complete construction work voted and already in hand. Of this latter sum roughly £11,000, expended on air power plant, will be recovered from the Power Company, the reimbursements being spread over a period of years. Apart from this, additional accommodation will be required for married employees, new central offices are recommended, and the artificial ventilation of the mine workings will require attention in the near future. Reviewing the position generally, the mine is again in a stronger position after the year's work. It is hoped by means of further technical improvements to render the plant already existing capable of maintaining the present profits with comparative ease. During the year to come very considerable addition will be made to the ore reserve, which will then be still more capable of supplying the requirements of a much larger reduction plant. The average number of natives employed for the year was 2,900, the supply improving gradually from the beginning of the year onwards. The manager and staff deserve congratulation on the marked improvement shown on the year's work.

Knight Central.

The following official statement was issued on Monday: The Main Reef has been intersected 17th level south of dyke, west shaft; average of four samples, 21·9 dwts. over 40 inches.

The best "Reef Traveller" is the *South African Mining Journal*.

LOSSES IN TIN RECOVERY.

The Late Mr. J. J. Beringer's Investigations—Extreme Fineness of Particles Lost.

At the Royal Polytechnic Society in mail week a good attendance of mining men and others followed with interest the presentation of a paper by Mr. W. H. Trewartha James, the material for which was compiled by the late Mr. J. J. Beringer, principal of the Camborne School of Mines. The chair was occupied by Captain Arthur Thomas, who remarked that Mr. Trewartha James, Mr. Pickard, and others followed up the researches of Mr. Beringer on the physical condition of tin, and the Polytechnic Society was fortunate in having Mr. James with them to introduce this question. Mr. Trewartha James said it was to a wonderland of small particles that Beringer's researches took him. The loss of tin on the dressing floors was due almost entirely to infinitely fine particles. And not only had Beringer defined the size of the particles lost, but he had drawn a line at the size of the particle which it was easiest to recover. It was a question whether, by altering their methods of crushing, they could produce less of their small particles and in such a manner increase the recovery of tin and reduce the loss. The result of the investigation—and that was the outstanding feature of the researches—showed that particles of cassiterite having a mean diameter of less than 5-1000 mm. appeared to be practically unsaveable, and only such proportion of those small particles were accidentally saved as happened to be held up in a bed of larger particles. It further appeared that the boundary line between particles of cassiterite that were easy of recovery and those that were difficult of recovery was fixed by the author at 25-1000. Particles of larger size were comparatively easy to recover.

Main Causes of Loss.

The main conclusions might, therefore be summarised: It appeared that the greater proportion of the losses of cassiterite in Cornwall arose from two main causes, the second cause merging automatically into the first. First, the excessive comminution of the cassiterite in the ore by the original crushing operation, which produced a serious proportion of particles of less than 5-1000 size; second, the production of granular cassiterite-quartz aggregates, in some of which the cassiterite occurred in particles so small as to be unmeasurable under the microscope. Those granular aggregates passed into the heads or into the middling products or into the tails. In the two former cases, on regrinding, a proportion of cassiterite was saved by being freed in particles of suitable size, whilst the remainder was lost, either as a less than 5-1000 product, or as cassiterite still entangled in the quartz matrix. In the third case, where the aggregate passed into the tails, it was all lost save such proportion as might be freed by attrition and weathering, and subsequently saved by the tin-streamers, as they were called, who re-worked the streams which carry the tailings away. That might explain partly why the tin streamers recovered still more cassiterite from the tailing streams all the way down to the sea.

Tin Dressing Losses.

Accepting the author's conclusions, they were now able easily to explain and to account for many, if not all, the serious and hitherto unpreventable losses that occurred in tin-dressing in Cornwall, and to clear up many hitherto unexplained mysteries. He had used the word "losses" in tin-dressing. He would try to give the members a clear conception of what these losses amounted to in Cornwall. In 1913 there were 8,354 tons of commercial black tin produced in Devon and Cornwall. The computed yield of metallic tin for that worked out at about £201 13s. 4d. The value of the black tin as sold to smelters on that basis worked out at £1,080,000. He would leave it to his audience to take any basis as the percentage of recovery, and proposed to take 70 per cent. recovered and 30 per cent. lost. In that case the gross value produced in 1913 was £1,542,800, and there was a loss of £462,800 that year in Devon and Cornwall alone. Those figures gave one reason to think furiously. It had been stated that Cornish tin mining was not at present in a very healthy state. Whether that was so or not he (Mr. James) would not deal, but could Cornish tin mining, or, indeed, any industry in the world stand a loss of half-a-million of its products annually? If a small proportion could be saved, they would be amply repaid by following Beringer's conclusions and working them to their logical conclusions.

What the Author Advocated.

The author most strongly advocated further investigation, the extended use of the microscope and micrometric measurement of particles, the study of sized particles and their defining properties, the determination of specific gravity, the extended use of the sieves, 120 to 200, the wet assay, and the indispensable vanning shovel in connection with dressing operations; but useful as all these might be, they were only means to an end; they were details. To his thinking—and they must hold him personally responsible for this opinion—the paper showed that they could not do much more with present appliances and methods than was being done. Primarily a new process was required. An additional 10 per cent., say, 2·5 lbs. cassiterite per ton, meant £150,000 extra per year to Cornwall. If these difficulties were overcome, that was by no means the limit of possible improvement. In fact, he estimated that by the expenditure of a comparatively small amount of money on research work, a saving of £300,000 per year might be effected. In conclusion, the lecturer said he felt Beringer was better appreciated in London than in Cornwall. A prophet was not without honour save in his own country, and to some extent that might be said there. Cornwall had produced many great men, but J. J. Beringer was one of the great men of Cornwall.

The Chairman's Opinion.

The Chairman said that in his opinion there was no ground for disputing in the main the conclusions at which Mr. Beringer arrived. The investigations should go still further, and they should go to this extent, that there should be microscopic slides made, and investigation conducted into the physical characteristics of the tin in the lodes before any stamping operations took place. He had observed in Cornwall, in the higher levels, that tin was in the form of visible crystallisation. As the mines go deeper, so the pronounced crystallism got less. They had arrived at the dividing point, that the fineness of the crushing would depend on the condition of the tin in the ore itself. The losses in tin had been much discussed in recent years, and during the last fifteen years he had not found out what the loss of Dolcoath was. They were getting nearer to it now. There were a great deal of losses, but whether they were preventable by present means remained to be seen. His rough idea was that the extraction of the exceedingly fine tin was a proportion to the area required for catching it. The losses were chiefly caused by this exceedingly fine tin, and the question appeared to him to be to make further researches and further trials to endeavour to discover if these losses could be minimised, and consequently give better financial results to the companies operating in the county.

Captain Paull (South Crofty) said they had always had losses and they always would. With present methods it stood to reason that with anything so fine it was impossible to make a recovery of 100 per cent.

Suggestion by Mr. Trestrail.

Mr. Nicholas Trestrail remarked that the question of lost tin had occupied the attention of miners ever since he could remember. There was a time in his younger days when there was a jealousy among mine managers, so much so that the "dressers" were sent around to neighbouring mines by night to see how much tin they were losing. For the past forty years the question of the loss of tin had attracted great attention, and no doubt there had been a lot of improved machinery brought to bear in order to catch the lost grains of tin. Up to the present he questioned whether the loss of tin was very much less than forty years ago. It seemed to him that in tin dressing to-day they were too much like the Yankee—all of a bustle. He believed that from the bin behind the stamps to the tail beyond the floors there was too much rush. It was all very well to say they were in for speed, but speed sometimes was a very costly thing. He suggested that it would pay Cornwall—outside of the mines—if men of means subscribed " a trifle " of money for the purpose of laying the question of the saving of tin out for scientific investigation. Somebody ought to " take the bull by the horns," and he thought the Cornish Institute of Mining Engineers, etc., would be just the institution to take the matter up. By doing this they might keep an industry, which was going down and dying, and make it have a tendency to lift up again.

THE POSITION OF THE NOURSE MINES.

Grade and Working Costs Lower—Reduced Profit—Ore Reserve Increased in Tonnage But Diminished in Value—Concentrated Scheme of Working.

Mining operations at the Nourse Mines for the year ended June 30, resulted in a profit of £158,043 9s. 6d., which is £34,183 4s. 7d. less than the previous year, although 62,600 tons more were crushed. The value of the ore treated showed a decrease of 2s. 1d. per ton, and working costs were 3d. per ton less. The profit was adversely affected by reason of the necessity for the performance of a considerable amount of maintenance work, an increase in the cost of several items of stores and in the cost of realising gold. Payments amounting to £1,510 17s. 4d. and £12,438 16s. 3d. have been made respectively on account of donations and contributions to war funds, etc., which, of necessity, are greater this year, and to the assessment under the Miners' Phthisis Act (Compensation Fund). Freehold and other items of revenue amount to £7,531 18s. 7d., leaving a net profit for the year's operations of £151,625 14s. 6d. The balance unappropriated at 30th June, 1914, was £96,568 14s. 3d., and £20 15s. 11d. dividends unclaimed for five years have been forfeited in terms of the Articles of Association, giving a total of £248,215 4s. 8d., which has been dealt with as follows:—Net expenditure on capital account, £415 1s. 9d.; Government taxes, £21,079 18s. 2d.; interim dividends Nos. 21 and 22 of 8¾ per cent. and 5 per cent., respectively, £113,825 7s. 9d.; total, £135,320 7s. 8d.; balance unappropriated, represented by cash and cash assets, less liabilities, £112,894 17s.; total, £248,215 4s. 8d. A special war levy on the mining industry of £500,000 has been made by the Union of South Africa in respect of its financial year ending 31st March, 1916. This tax, which will be distributed amongst gold mining companies *pro rata* to the amount paid by them under the Mining Taxation Act, 1910, during the same period, cannot be accurately ascertained until all returns are made to the Government in this respect. Provision has been made in the balance sheet for the estimated assessment under the Act, amounting to £7,000, which sum has been charged to appropriation account in the accounts now submitted. The amount of the tax is payable as regards 50 per cent. on the 31st December, 1915, and the balance on 31st March, 1916. The directors point out that the results for the period covered by this report have been affected by the European war, a rebellion in the Union of South Africa, and by the raising of a military force for the conquest and occupation of German South-West Africa. In common with other large employers of labour, the company allowed half-pay to married men and assisted the dependents of single men in its service who enrolled for military duty in South-West Africa. The same allowances have been extended to men who volunteer for active service with the Overseas Contingent being raised. The war has also been responsible for advances in prices in general mining supplies and in the cost of living, to meet which the company has made an allowance to lower paid employees to whom any additional cost is a matter of moment. It will be noticed that the value of stores on hand has considerably increased. This is due to the laying in of large stocks of stores which are essential to the continuation of mining and milling operations. The gold produced is being realised under arrangements made with the Bank of England. The consulting engineer, Mr. H. Stuart Martin, writes:—

The operations for the year, though conducted on a greater scale than in the preceding year, resulted in a reduced profit, viz., £158,043, as compared with £192,227. The reduced profit is due to the lower value of the ore mined, as working costs were slightly lower than in the previous year. The lower costs are satisfactory, taking into consideration the increased amount of development work and a certain number of disabilities connected with the war. The South Nourse Section, which produces very little ore for milling, entails a heavy expenditure for equipment and shaft sinking, which is practically all charged to working account. The labour supply was inadequate in the earlier months of the year, but showed gradual improvement in the second half. The increased supply was utilised as much as possible in hand stoping. In a steep and heavily-faulted mine such as this, the forced use of rock drills in stoping has a detrimental effect on the quality of the ore mined and the condition of the underground workings. The amount of development work accomplished totalled 26,411 feet—a considerable improvement. The South Nourse main incline shaft was deepened a further 330 feet, and is now well below the 24th level, which will be equipped as a main station and concentrating level. Several subsidiary developing inclines in different sections of the mine have made good progress, and will serve to open up undeveloped areas more rapidly. A considerable amount of attention has been devoted to testing the Main Reef and Leader in the older portions of the mine, which have hitherto produced a large proportion of South Reef. A fair percentage of payable but low grade ore has been disclosed in this manner. Taken as a whole, the tonnage developed for the year has not been very encouraging, the proportion of unpayable ore being large. The payable ore developed for the year totalled 892,300 tons, of an estimated value of 5.5 dwts. per ton. The payable ore reserve has been re-estimated and re-valued, and is as follows: Main Reef, 1,116,900 tons, value 5.1 dwts. (21s. 5d.); Main Reef Leader, 696,600 tons, value 6.3 dwts. (26s. 6d.); South Reef, 1,138,900 tons, value 6 dwts. (25s. 2d.); total and averages, 2,952,400 tons, value 5.7 dwts. (23s. 11d.). The above estimate is based on stoping widths averaging 74, 46 and 60 inches in the three reefs respectively. Compared with the reserve of the preceding year, there is shown an increase in tonnage of 478,700 tons and a decrease in average value of 0.7 dwt. per ton. The increase in tonnage is partly due to excess development and partly to the increased stoping widths used in the estimate. The decrease in value is partly due to this latter feature, and to some extent to the gradually increasing quantity of low grade Main Reef developed. In addition to the reserve, there are developed in the mine 319,400 tons of a value between 3.8 and 4.3 dwts., the figure taken for the year's general pay limit. The benefits derived from the general scheme of concentration, which was referred to in last year's report as practically completed, have been considerable, in so far as such a system can be applied to a mine where the workings are so scattered and numerous. The labour employed during the year averaged 550 whites and 4,513 coloured, as compared with 565 whites and 3,515 coloured in the preceding year. It is impossible to forecast values that may be obtained in the future development of the deeper levels in the South Nourse Section. Recently more promising values have been disclosed in the western portion of this area, and it is quite possible that good blocks of ore will be opened up here. However, on the whole, the present indications are that we must look forward to a low grade of ore of a value approximating that of the average of the present ore reserve. Attached to the report is a plan of the underground workings, drawn of a larger scale, in the hope that the position of the mine can be more clearly followed than last year. The manager and his staff have been most energetic in endeavouring to overcome the difficult conditions that are so well known on this mine, and the results are by no means the measure of these efforts.

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IS RAND MINE VENTILATION INADEQUATE?

A Criticism of Underground Conditions—High Temperatures a Cause of Slackness and Discontent.

[From a Correspondent.

The first impression gained by a visitor to the Rand would probably be that the men employed on the gold mines are the most favoured of the world's workers. In a sixty mile tour from Springs to Randfontein may be seen evidence that the mining companies pay considerable attention to catering for the social side of life of their employees. Thousands of pounds have been spent on recreation rooms, where men may play billiards or chat in comfort with their friends. In the libraries and reading rooms which exist on almost every mining property may be seen almost all the periodicals of importance, from the *Scientific American* to the *Sporting Times*. Tennis courts are much in evidence, and swimming baths are not unknown. On some properties there are facilities for playing golf, and miniature rifle shooting is a prominent recreation in many circles. The men who go underground are reputed to earn high wages for eight hours' work per day, and apparently have opportunities for full enjoyment of the means of recreation provided by their employers. During the last six years there has been a gradual decrease in the number of accidents underground, and mining should no longer be regarded as an abnormally dangerous occupation. The accident death-rate for 1914 constitutes a record, and the risk of a miner contracting phthisis is certainly becoming less every year. The value of a man's income, of course, depends upon its purchasing power, and though a great deal has been said about the cost of living in the Transvaal, those who have carefully examined the ratio between wages and the necessary expenditure of mine workers must admit that their position compares favourably with that of workers in other parts of the world. A review of the situation should be of interest to everyone who desires the advancement of the most important industry in South Africa. According to the recently issued Annual Report of the Government Mining Engineer, the average earnings of miners and underground labourers on the Witwatersrand is 20s. 3d. per shift. The man who makes what he terms a good cheque is not usually reluctant to refer to what is to some extent evidence of his ability as a miner. In writing to his friends in Cornwall, Cumberland, or Montana, he is apt to refer to the success which he is achieving, and say, "Come over and do likewise." Therefore, one would expect to see the Rand invaded by an army of well-trained and skilful miners, and that the Colonial youth would regard mining as a very desirable occupation. What is the real position of affairs? There may be a number of unemployed in the streets of Johannesburg at the present time, but the writer would hesitate to describe the majority of these as men skilled in any class of work which demands years of apprenticeship. In a report from the Johannesburg Inspectorate it is stated that "the real first-class miner is noticeably scarce," and the Inspector of Mines from the Germiston district says that the remarks which he made in 1912 still hold good. He pointed out that "good and intelligent miners are getting scarce daily in this district owing to men obtaining benefits under the Phthisis Acts." It is reasonable to suppose that the number of claimants for compensation under the Phthisis Act will decrease each year, as the old cases are worked off—and as there are introduced means for reduction in amount of dust underground. The question of Phthisis Prevention is not within the immediate province of this article. We are informed that "first class miners from abroad are not coming forward in sufficient numbers," and though the Inspector of Mines for the Johannesburg District states that "the Colonial miners continue to give satisfaction in every branch in which they are employed," we learn from another source that the "average South African youth does not take kindly to underground work." Suspension of operations on diamond mines and other work owing to the war has resulted in transference to the Rand of a large amount of white and native labour, but these effects are only transient and it is hoped that all industries in South Africa and elsewhere will soon revert to normal conditions. Resumption of work on the diamond mines where wages and general conditions at first sight appear to be inferior to those of the Rand will mean withdrawal of many workers from this district. The average earnings of the men engaged in the diamond mines of the Orange Free State is less per shift for a greater number of working hours than those demanded by the gold mining companies of the Transvaal. The diamond mines do not appear, however, at any time to have experienced any difficulties in obtaining any class of labour necessary for the success of their undertakings and, in view of the high wages relative to cost of living, short hours of employment and ample provision for entertainment on completion of the day's labour on the Witwatersrand, the condition of affairs surely justifies the query

What is Wrong with the Mines?

In no part of the world is there so heterogenous a body of workers as on the Reef, to which has wandered men from every mining camp. After making allowance for the unstable temperament of the individual worker and climatic conditions which do not tempt him to go underground there is still lacking some explanation for the spirit of discontent which exists in this district. A healthy discontent tends towards progress, but on the Rand there is a spirit which is certainly not conducive to the welfare of the gold mining industry. It is not confined to any section of the mine workers. In Europe the mining communities usually consider their occupation as a life's work. On the Witwatersrand a large proportion of the men regard the mine simply as a means for making money, hope to accomplish that, and get away from it as quickly as possible. Mine managers who appear to have a keen eye on grade and tonnage have frequent side glances on a farm to which they hope to rtire when circumstances permit. Mine captains may refer to the charms of cattle ranching in Rhodesia, and the writer has heard a shift boss, who is apparently a zealous and conscientious official, declare on mention of the word mine that he "hated the very sight of it." Men engaged on machine stoping, who are giving keen attention to their work and trying to save money, occasionally refer to the time when they hope to leave the mine for ever, and appearances often suggest that the trammer from the high veld is underground because he could not help it. The Boer has often a large family, undivided interests in a farm are not satisfactory, and the value of mealies is very fluctuating. Coal miners on the continent of Europe generally commence work underground on leaving school, with the intention of continuing on that work for the term of their natural life. Fifty years' service at a mine is not uncommon. The writer has seen working at a coal face a miner who had 62 years' underground, and less than 10 miles from that colliery there was a presentation to a man on completion of 80 years' service in the mine. This is probably a record, and, in thanking his employers for their gift, the recipient said that he could not see any reason why he should retire from work. The gold of the Witwatersrand does not lie in patchy deposits likely to be exhausted after a few years working, and it should be regarded as a source of permanent employment for a large number of workers. Why do they not flock to it with the intention of staying on the Rand for several decades to the satisfaction of their employers and to their material well-being? Mine managers may complain ofg the cantankerous character of their men, junior officials may have objections to what is termed the speeding up movement, but it is useless to refer to these matters unless one searches to root of the discontent. It is almost entirely a question of underground conditions. The temperature of the mines is far too high. The situation should be thoroughly analysed. Take the case of a miner in charge of half a dozen machines. He is anxious to make a big cheque and, apart from "breaking ground" has usually little or no interest in anything connected with the mine. Possibly there are several green boys in his gang and machines break down occasionally. He puts in a fairly strenuous shift if he is keen on getting satisfactory results for his eight hours spell underground. Before his machines start work the atmosphere of the stope or drive may usually be described as stuffy and after rushing from one machine to another throughout the day he frequently arrives at the surface with only sufficient energy for indulgence in a "grouse." Meeting others in a similar condition they commence to discuss the cussedness of the officials, the failings of their machine boys, and other grievances. Grievances are more infectious than measles and far more deadly. The man who does not know that he has any cause for complaint soon finds one when he hears of the afflictions, real or imaginary, which weigh upon his friends. The underground worker is tempted to loaf round the mine property, or indulge in something more exciting than a walk round a billiard table, and he is ready to burst out into any kind of frolic from a strike to an anti-German riot. Given conditions of work which do not sap his energies he may become as steady and reliable as the miner in the coalfields of Great Britain or France. The amelioration of conditions underground is almost entirely a question of better ventilation. This would tend to reduction of mine temperatures and probably the abolition of the scourge of phthisis. The question of underground temperature and its effects on the worker has received considerable attention by European investigators, who report that a temperature of over 70° F. on a wet bulb thermometer tends to "slackness." This figure is exceeded on many mines on the Rand. Do the remarks of the manager to outsiders on the question of slackness on his mine always coincide with comments made to the officials on the property. Ignoring rumours on this question, it must be admitted that a man cannot do his best for himself or employer when working in an atmosphere of 75° to 85° F. with humidity almost approaching saturation point. A reduction of 10° in the temperature would mean not merely an increase of 10 per cent. in the efficiency of white and native labour, but would also tend to reduce accidents. A ganger not inclined for exertion may neglect to give attention to "hanging" of doubtful character, the most fruitful cause of accidents on the Reef. He persuades himself that it will be alright and will come down when he blasts at the end of the shift. It is the unexpected falls that cause the accidents. A native who is half asleep through the influence of warm air is a source of danger to himself and other workers in the vicinity. The majority of accidents are due to trivial causes, and a stone or piece of drill steel which is permitted to roll down a steep stope may be quite as deadly as the effects of a rifle bullet. The question of ventilation is worthy of the attention of every mine official, and until the subject receives the attention such as is given to it in older established mining districts, the Rand miners will rontinue to be designated as "underground quarrymen," and we shall be told that their interest in the mines is confined to what they can get out of them. The men on the mines will not seek to hide the fact that they hope to get away from their present occupation at the first opportunity, and to the detriment of the industry, leave it when their services are of most value. The introduction of methods of ventilation such as are enjoyed on large mines in Europe and America will solve many of the problems which beset the mining community of the Rand at the present time. Efficiency of the workers, tendency to contract phthisis, general health of the miner, and labour troubles are all direltly or indirectly connected with the ventilation of mines on the Rand, and the sooner the subject receives the attention which it merits the better for all concerned.

S.W. Diamond Fields August Returns.

Forty different areas contributed to the diamond output from the alluvial diggings in the Western Transvaal during the month of August, and the total is the best for any month since the outbreak of the war, the figures for the eight months of 1915 being as follows:—

	Carats.	Value.
January	1,065¼	£2,593 5 6
February	1,607¾	4,273 11 6
March	2,066½	6,325 9 6
April	2,595	10,181 1 6
May	2,173	9,389 4 0
June	2,092¾	9,402 13 6
July	2,292	8,984 8 0
August	2,803¾	10,543 19 0

THE INDIVIDUAL PRODUCERS.

The most important areas contributing to the output, and their total finds in August, were:—

	Carats.	Value.
Bloemhof	447½	£1,777 4 0
London	469½	1,688 15 0
Dievedraai	343	1,528 13 0
Goedehoop	242¾	1,012 4 6
Cawood's Hope ...	247	1,005 10 0
Kameelkuil	130¾	640 2 0
Klipkuil	123¼	170 10 0
Kromellenboog	73½	272 15 0
Mimosa	99	270 10 0
Eastleigh	46	212 15 6
Panfontein	58½	183 2 6
Koppiesvlei	108¾	168 2 6
Vechtvallei	36	132 0 0
Modderkraal	23¼	118 0 0
Diamantdoorns ...	31¼	101 15 0

Problems of Mine Valuation.

A *Bulletin* lately issued by the State of Wisconsin is called "A Study of Methods of Mine Valuation and Assessment," by W. L. Uglow. Although referring more particularly to the zinc mines of Wisconsin, the principles are of general application. The author discusses the treatment of royalty and interest upon working capital, neither of which he thinks can equitably be considered as an addition to working costs, and both should, therefore, come wholly out of profits. The methods of valuation proposed by the author are applicable only to mines of short life. He discusses the following in detail, viz.: (1) The Finlay *ad valorem* method which calculates the value of a mine as the present value of the average annual profits that may be expected to be obtained during the life of that mine, setting aside an annual sinking fund instalment. the total amount of all of which instalments, at the end of the estimated life of the mine, will amonnt to the present value; (2) the Arizona method, which takes the value of a mine for the purposes of taxation as represented by one-eighth of the gross production of the previous year, fonr times the net profit of the previons year and the value of the improvements; (3) the Coloroda method, which takes the value as one-fourth of the value of the gross output of the preceding year, unless the net exceeds one-fourth of the gross, in which case the net output is taken to be the assessable value, except in the case of mines of the precious metals, where the value is taken to be half the value of the gross output plus the entire net output; (4) the equated income method, which takes the valne as the present value of all future profits, these latter being taken as equal to the actual profits of the preceding year. excluding royalty, interest, and amortisation charges, assnming the same average length of life for all the mines of a district. The last named method is favoured by the author, who very rightly insists upon the fact that mining property is a wasting asset, and should not, therefore, be taxed on the same basis as ordinary real estate. The views of the author are necessarily controlled somewhat by the special circumstances obtaining in Wisconsin, where owing to conditions of tenure there are generally three separate parties interested in the mining property, viz., the lessees, the royalty owners and the banks advancing the working capital.

Sheba G.M. Co.

The following results of operations at the Sheba mine for the month of August, 1915, are officially supplied:—Tons crushed, 7,440; yield, 2,346 fine ozs.; estimated profit, £1,500.

THE MARKET FOR SOUTH AFRICAN ASBESTOS.

Samples Valued by British Firms—Creation of Larger Market.

Mr. W. R. Dunston, writing from the Imperial Institute, London, states:—I enclose a report on a small consignment of asbestos from South Africa which was forwarded to the Imperial Institute by the Acting Trades Commissioner in London. The asbestos was supplied in order that valuations might be procured from firms in this country for comparison with quotations previously obtained in Germany. In this connection it will be seen from the report that some of the firms consulted stated that there is only a limited demand for South African blue asbestos in the United Kingdom in comparison with that for the white variety, and that the principal market for the former has hitherto been in Germany. It is, unfortunately, impossible to obtain any figures as to the relative consumption of blue asbestos in the United Kingdom and Germany, as some of the shipments made direct to the United Kingdom from South Africa may have subsequently been re-exported to Germany. The following figures from the annual statements of the trade and shipping of the Union of South Africa are, however, of interest:—Exports of asbestos from South Africa:—To Great Britain: 1909, 1,556,431 lbs.; 1910, 1,171,851 lbs.; 1911, 1,410,306 lbs.; 1912, 706,343 lbs.; 1913, 752,380 lbs.; 1914, 1,459,757 lbs. To Germany: 1909, 2,049,294 lbs.; 1910, 1,988,664 lbs.; 1911, 1,597,693 lbs.; 1912, 705,187 lbs.; 1913, 594,012 lbs.; 1914, 625,413 lbs. Total exports: 1909, 3,635,385 lbs.; 1910, 3,493,491 lbs.; 1911, 3,249,743 lbs.; 1912, 2,619,045 lbs.; 1913, 2,271,736 lbs.; 1914, 2,613,888 lbs.

What the Figures Show.

These figures show that during the years 1913 and 1914 a larger quantity of asbestos was shipped from South Africa to the United Kingdom than to Germany, whereas during the years 1909 to 1911 the reverse was the case. This gradual change in the relative quantities of South African asbestos exported to the two countries suggests that during recent years a larger use has been found for the material in the United Kingdom, unless the alteration in the first destination of the export is to be attributed to changes in shipping facilities. It appears improbable, however, that asbestos finally destined for Germany would have been shipped recently in such large quantity to this country for re-export, rather than direct to Germany as in former years. On the whole, it seems likely that a larger market could be created for South African asbestos in the United Kingdom, and it is possible that when the material is better known higher prices may be obtained for it. It would seem desirable, therefore, that the owner of the deposit from which the asbestos dealt with in this report was obtained should approach British firms direct with offers of the material. The samples submitted should be properly cleaned and graded according to the length of the fibres, and information should be given as to the quantities of each grade which could be offered. A list of the chief British merchants and manufacturers interested in asbestos is enclosed for this purpose.

Asbestos Manufacturers.

Messrs. Turner Bros., Ltd., Rochdale; Messrs. Bell's United Asbestos Co., Ltd., 59, Southwark Street, London, S.E.; Messrs. Dick's Asbestos Co., 51, Fenchurch Street, London, E.C.; Messrs. Snowdon, Sons & Co., Ltd., West Ferry Road, London, E.; Messrs. James Walker & Co., Ltd., Lion Works, Garford Street, Poplar, London, E.; Messrs. Witty & Wyatt, Ltd., 38, Commercial Street, E.; The British Asbestos Co., Ltd., 132, Commercial Street, London, E.C.; The Asbestos and Engineers' Stores Co., 66, Bermondsey Street, London, S.E.; Messrs. Bennet & Day, Commercial Mills, First Street, Huddersfield; The British Fibrocement Co., Ltd., 6 and 7, St. John Street, Cardiff; Messrs. H. Caldwell & Co., 32, Strand Street, Liverpool; Messrs. William Hollywood & Co., 36 and 36a, King Street, Tradeston, Glasgow; The Jackson Asbestos Manufacturing Co., Jenkins Street, Small Heath, Birmingham; Messrs. W. Jeeseman & Co., 157, Commercial Street, Newport, Mon.; Messrs. Lewis & Tylor, Ltd., Grange Mills, Cardiff; The Phœnix Asbestos and Packing Co., 11, Cochrane Street, Glasgow; Messrs. Frank G. Price & Co., 133b, George Street, Edinburgh; Messrs. John William Roberts, Ltd., Midland Works, Canal Road, Armley, Leeds; The Rochdale Asbestos Co., Ltd., Shawclough, Rochdale; The Scottish Asbestos Co., Ltd., 23, Cadogan Street, Glasgow; Messrs. Sutcliffe & Sutcliffe, Hope Works, Blackfriars, Manchester; Messrs. J. & W. Tinto, Ltd., 97, Holm Street, Glasgow. Asbestos Merchants: Messrs. Bolling & Lowe, 2, Laurence Pountney Hill, London, E.C.; Messrs. Everitt & Co., 40, Chapel Street, Liverpool; Messrs. Hall & Hall, 47, Leadenhall Street, London, E.C.; F. C. Harbott, 36, Camomile Street, London, E.C.; Messrs. Wilson & Co., 79, Queen Street, London, E.C.; Messrs. Bell & Co., 112, Bute Street, Cardiff. The asbestos from South Africa, which is the subject of this report, was forwarded to the Imperial Institute by the Trades Commissioner in London. The material was sent in continuation of a previous inquiry, in order that the samples might be submitted for valuation to a number of firms in the United Kingdom. The consignment weighed about 35 lbs., and consisted of two portions, as follows:—(a) A bag containing 3½ lbs. of crocidolite asbestos, free from rock impurity, clean and of good colour. The fibres were tough, and varied in length up to 1½ inches. Such asbestos would be suitable for textile purposes. (b) The bulk of the consignment, weighing about 31 lbs., consisted of crocidolite asbestos mixed with a considerable amount of rock impurity, and included many lumps of unteased fibre. The teased portion of this asbestos was, on the whole, duller and of poorer colour than the smaller portion (a), presumably owing to the presence of rock dust, but otherwise it did not appear to differ from (a) in quality. The asbestos included in portion (b) was freed as far as possible from the rock impurity by hand-picking and sifting at the Imperial Institute.

Commerce Valuation.

Samples of the asbestos representing both (a) and (b) were submitted to several firms of manufacturers and merchants, who valued them as follows:—(1) One firm stated that this type of asbestos was largely used in Germany, but that there is not much demand for it in the United Kingdom. They considered the samples to be of fairly good grade, and estimated their value in the United Kingdom, if there were a demand for this quality, to be about £45 to £50 per ton (May, 1915). They added that they had recently paid about these prices for similar material. (2) A second firm described the samples as of very good quality for this particular grade of asbestos. They stated the value of such fibre, if over 1¼ inches long and of good colour, would be about £35 to £40 per ton; and if from ½ to 1¼ inches long, about £28 to £30 per ton. The firm added that a large quantity of the blue asbestos marketed is liable to be badly discoloured, and that this greatly affects the price. (3) Another firm values sample (a) at £35 per ton and sample (b) at £28 10s. per ton, c.i.f. English ports. They added that the demand for blue asbestos, although considerable, is not nearly so large as that for the white variety. (4) A fourth firm stated that they were not themselves interested in blue asbestos, but they considered that both samples were of fair quality and that they would be saleable in the United Kingdom at prices ranging from £20 to £30 per ton. It will be seen from these reports that the three firms who utilise blue asbestos place the value of material represented by the samples at from £28 to £50 per ton, the price varying according to the length and colour of the fibres. The fourth firm, who stated that they do not use blue asbestos themselves, valued the samples at a lower price.

Other Remarks.

The demand in the United Kingdom for crocidolite asbestos appears to be comparatively limited in comparison with that for the chrysotile variety, and the chief market for the former is stated to have hitherto been in Germany. Consignments of blue asbestos would, however, be saleable in the United Kingdom, and it is possible that a better demand might be created for it in this country. It seems doubtful, however, whether the material will realise at present such high prices in the United Kingdom as those stated to have been offered for it in Germany. The material would require to be freed from rock impurity, and to be graded according to the length of the fibres before export if satisfactory prices are to be obtained for consignments.

YIELD, COSTS, AND PROFITS IN AUGUST.

Official Analysis by the Transvaal Chamber of Mines—Some Excellent Returns.

The monthly Transvaal Chamber of Mines analysis of gold production in the Transvaal for August, 1915, shows, *inter alia*:—

THE WITWATERSRAND.

	Tons.	Value.	Ounces.	Yield per ton.		Cost per ton.		Profit.
		£		s.	d.	s.	d.	
Aurora West United	15,230	18.100	4,261	23	9	18	3	4,074
Bantjes Consolidated	21,300	23,651	5,568	22	3	19	4	2,701
Brakpan Mines	64.200	89,211	21,002	27	9	17	4	32,812
City and Suburban	29,300	51,296	12,076	35	0	20	6	20,338
City Deep	62,400	123,605	29,099	39	7	19	1	62,227
Con. Langlaagte	54,000	70,058	16,493	25	11	14	5	31,059
Con. Main Reef	28,180	40,336	9,496	28	8	19	6	12,018
Crown Mines	207,000	270,168	63.603	26	1	16	4	97.118
Durban Roodepoort	14,736	14,684	3,457	19	11	15	6	3,249
Durban Rood. Deep	27,520	37,716	8,879	27	5	22	6	6.212
E.R. Prop. Mines.	175,000	227,487	53,555	25	8	18	11	54,243
Ferreira Deep	56,850	96,776	22,783	33	8	18	6	41,560
Geduld Proprietary	26.200	39.436	9,284	30	1	20	8	12.200
Geldenhuis Deep	54,200	71,863	16,918	26	6	21	10	11,576
Ginsberg	15,785	17,696	4,166	22	4	17	3	4,051
Glencairn Main Reef	21,780	14.060	3,310	12	6	10	11	1,743
Govt. G.M. Areas	48,000	65,407	15,398	27	3	19	11	17,514
Knight Central	25,600	29,335	6,906	22	5	19	10	3,349
Knights Deep	108,400	77,254	18,187	14	3	11	11	12,735
Langlaagte Estate	53.480	61,070	14,377	21	4	17	7	13.281
Luipaardsvlei Estate	21,535	25,346	5,967	23	6	19	3	4,335
Main Reef West	25.290	28,490	6.707	22	6	19	2	3,698
May Consolidated	14,500	11,040	2,599	15	3	13	10	1.003
Meyer and Charlton	15,000	34,364	8,090	45	10	18	0	20,489
Modderfontein B.	43,500	97.405	22,931	44	9	15	3	62,889
Modder Deep Levels	34,000	62,403	14,691	36	9	16	2	34,643
New Goch	30,200	29,738	7,001	19	8	13	11	8,440
New Heriot	13,200	23,413	5,512	35	6	21	8	8.760
New Kleinfontein	55,000	70,546	16,608	25	4	17	0	23,027
New Modderfontein	52,500	102,727	24,184	39	2	17	2	56,234
New Primrose	23,400	19,548	4,602	16	8	11	6	6,015
New Rietfontein	4.687	5,055	1.190	17	5	16	8	529
New Unified	13,900	14,081	3,315	20	0	12	11	4,950
Nourse Mines	58,100	70,003	16,480	24	1	19	10	11.437
Princess Estate	22,500	28.800	6.780	25	3	25	2	358
Randfontein Central	204.739	249.452	58.726	24	3	18	1	61.305
Robinson Deep	55,500	82,117	19.332	29	7	14	2	41.610
Robinson Deep	53,000	79,590	18,737	30	0	19	0	25.548
Roodepoort U.M.	33,800	30,567	7.196	18	1	17	5	943
Rose Deep	69,700	87,049	20.493	25	0	16	6	28,402
Simmer and Jack	70,200	73,311	17,259	20	11	13	6	28,332
Simmer Deep	59,700	48,008	11,302	16	1	15	9	3.715
Van Ryn	38,900	46,534	10,955	23	11	13	0	19,442
Van Ryn Deep	42,250	79,148	18,633	37	6	17	2	42,970
Village Deep	53,200	79,216	18,649	29	9	19	4	26,598
Village Main Reef	32,500	55.573	13,083	32	8	17	7	25,947
Vogelstruis Estate	14,563	12,102	2,849	16	7	19	5	*1,996
West Rand Central	1,972	2.608	614	26	5	30	0	*349
West Rand Con.	30,500	39,398	9,275	25	8	18	9	10,473
Witwatersrand	42,850	52,986	12,474	24	9	14	0	22,956
Wit. Deep	42.700	52,931	12,461	24	6	16	9	16.069
Wolhuter	35,900	44,240	10,415	24	8	16	4	14,022
Miscellaneous producers	—	6,983	1,644	—		—		—

* Loss.

OUTSIDE DISTRICTS.

	Tons.	Value.	Ounces.	Yield per ton.		Cost per ton.		Profit.
HEIDELBERG—								
Nigel	11,800	15,211	3,581	25	9	25	10	*182
Sub-Nigel	6,930	14,931	3,515	43	1	32	1	2,195
BARBERTON—								
Barrett	4,029	1,627	383	8	1	—		—
Fairview (T.C.L.)	1,800	3,288	774	36	6	29	7	568
Sheba	7,440	9,965	2,346	26	9	22	5	1,619
Worcester Exploration	4,700	3,033	714	12	11	16	7	*882
KLERKSDORP—								
Quest G.M. and D. Co.	3,632	2,795	658	15	5	13	5	359
LYDENBURG—								
Ceylon Lydenburg	1,032	934	220	18	1	15	0	144
Glynn's Lydenburg	4,095	7,366	1.734	36	0	20	0	3,168
Rietfontein (T.C.L.)	1,112	1,351	318	24	4	17	8	64
Trans. G.M. Estates	13,250	31.166	7,337	46	3	21	9	15,754
Miscellaneous producers	—	32,327	7.611	—		—		—

Companies to be Dissolved.

In accordance with the Companies Act, 1909, at the expiration of three months the names of the undermentioned companies will, unless cause is shown to the contrary, be struck off the register, and dissolved:

79. Paarl Pretoria Goud Mijn en Exploratie Maatschappij, Beperkt: registered 23/2/1888.
228. Edna Gold Mining Company, Limited; registered 7/2/89.
443. Pretoria Steam Laundry Company, Ltd.; registered 31/10/89.
1990. Zaberi Diamond Mining Syndicate, Ltd.; registered 11/9/03.
2103. Mikado Diamond Syndicate, Ltd.; registered 16/5/04.
2789. Transvaal Bischoff, Ltd.; registered 31/5/07.
2882. Kleinkramer and Company, Ltd.; registered 26/11/07.
3225. Pretoria Pegging Option and Developing Syndicate, Ltd.; registered 30/9/09.
3311. Novelties, Ltd.; registered 18/2/10.
3356. The Zandrivier Mineral Prospecting Syndicate, Ltd.; registered 19/3/10.
3486. The New Drill, Ltd.; registered 15/6/10.
3585. Geen and Richards (Pretoria), Ltd.: 10/10/10.
3707. The B.M.R. Syndicate, Ltd.; registered 30/3/11.
3733. The Unity and Victory Gold Mining Company, Ltd.; registered 25/4/11.
3803. Zoutpansberg Coppers, Ltd.: registered 2/8/11.
3956. M.A.G., Ltd.; registered 13/3/12.
4075. The Transvaal Tyre and Motor Co., Ltd.; registered 4/10/12.
4146. Ingrams, Ltd.; registered 11/2/13.
4172. The Colox Paint Company, Ltd.; registered 19/3/13.
4258. The Rand Pawnbrokers, Ltd.; registered 14/7/13.
4343. The Naboom Tins, Ltd.; registered 3/12/13.
4365. African Cinemas, Ltd.; registered 30/12/13.
4456. The African Prospectors' Company, Ltd.; registered 10/6/14.
4461. Hellenic Commercial Co. (S.A.), Ltd.; registered 23/6/14.
4491. The Mineral and Trust Company, Ltd.; registered 7/8/14.
4501. The Pala Pala Gold Mines, Ltd.; registered 21/8/14.
4539. Yeoville Laundry, Ltd.; registered 18/12/14.
4584. The Union Bootmakers' Corporation, Ltd.; registered 8/4/15.

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MINE SURVEYOR'S
by Class, Private Tuition and Correspondence
SOME 1914 RESULTS:—
MANAGERS - - - January and May - ALL Passed.
ELEC. ENGINEERS - February - - - - - 66% "
MECH. ENGINEERS - June (Kimberley Centre) - - ALL "
MINE OVERSEERS - - - - - Practically ALL "
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METALLURGICAL PRACTICE ON THE RAND.—VII.*

[By F. L. BOSQUI, lately Chief Consulting Metallurgist to the Rand Mines Central Mining Corporation.]

TREATMENT OF SAND.

The treatment of the sand by leaching with cyanide solution in steel in tanks, ranging in size between 45 and 56 ft. in diameter, is still the accepted practice. In the early days an attempt was made to collect and treat sand in the same tank, but an imperfect knowledge of classification, or a failure to recognise its importance, made this scheme impracticable. Until very recently the prevailing practice was to collect the sand in a series of tanks, known as "collectors," from which it was shovelled out by natives and transferred to the treatment tanks. The majority of plants were built with the collector superimposed on the treatment tank. but this arrangement was finally superseded by the erection of collectors and treatment tanks on the same level, the transference of sand from one to the other being by means, first, of trucks, and later by belt conveyor. The latter was supposed to be cheaper in first cost, as it eliminated the expensive steel superstructure for supporting the enormous weight of superimposed tanks, and also reduced the height of pulp elevation. But it would appear now, after a pretty thorough experience with both systems, that, as regards first cost, the superimposed system has a slight advantage; while owing to the rapid disintegration of conveyor belts in the dry atmosphere of the Rand and the considerable maintenance cost of conveyor systems in general, the superimposed tanks are less expensive to operate, in spite of the higher pulp lift required. At the present time there is still considerable variation in the modes of collecting sand. The following methods are in use:—(1) In the older plants all the mill pulp is run into a collector, through a rubber hose 4 to 6 in. in diameter, manipulated by a Kaffir, who moves about in the tank changing the position of discharge to prevent undue slime accumulations; the slime and water, with varying proportions of fine sand, overflow through discharge gates provided with an adjustable canvas blind, which is raised to suit the overflow as the tank fills. (2) The total mill pulp is distributed to the collector by means of a peripheral launder provided with outlets; the water and slime overflow through an adjustable opening at the centre. (3) The sand is classified and thickened in diaphragm cones, dewatered on a sand-filter table, and delivered in cyanide solution either to a collecting or treatment tank by means of a Butters and Mein distributor. (4) The sand is classified in hydraulic cones and delivered in water to a collecting tank by means of a Butters and Mein distributor. It was formerly customary in some plants to give the sand a preliminary treatment with a weak cyanide solution in the collectors. This practice has now been generally abandoned, and the only operation that takes place in the collector is the forced drainage of the charge by means of pumps, thus reducing the moisture to about 14 per cent. The sand is discharged from the collectors by (1) hand shoveling through discharge doors into treatment tanks or to belt conveyors; (2) by means of the Blaisdell excavator. The high capital outlay required for the latter, without compensating economy in operation, has led to the retention in newer plants of the older system of hand shoveling by natives. All plants using a belt conveyor from collectors to treatment tanks have, however, retained the excellent Blaisdell distributing mechanism for distributing the sand in the treatment tank. The system of applying cyanide solution to the sand does not differ essentially from practice elsewhere, and need not be particularised here. The standard strength of strong solution used ranges between 0.10 and 0.25 per cent., depending upon local conditions, the tendency in recent years being to use weaker solutions than formerly. From six to eight days' contact is usually allowed in the treatment tanks, and about two parts of solution to one of ore is the average quantity required for leaching purposes. The methods in vogue of disposing of the residue are by hand shoveling or excavation with the Blaisdell machine into (1) trucks, (2) Bleichert aerial conveyor, or (3) belt conveyor. The second method is used at only one property, the Brakpan mines, where it is reported to be giving satisfaction; the third method is used on two mines, but whatever advantages it may possess have not been generally recognised, while the first method, namely, truck haulage by surface cable, is in general use. It is considered the cheapest, most flexible, and best adapted to local conditions, and will probably continue to be the favourite means of disposing of sand residue

TREATMENT OF SLIME.

Since 1894 the continuous treatment of slime by the so-called decantation method has meant the recovery of over 80 per cent. of the gold from a very considerable portion of the total ore crushed, and has been retained by the majority of operating mines. In most cases, however, it has been retained, not because its limitations have not been recognised, but because possible improvements in recovery do not always justify the sacrifice of capital involved in replacing old plants with new, especially on mines of short remaining life. The technique of decantation, which is well described in several technical works, need only be briefly touched upon here. The slime pulp from the classifiers is settled in what are known as collectors, large cone-bottom tanks, provided with an overflow rim and adjustable decanter, in which the slime settles to the bottom, the water escaping at the overflow rim. The settled slime charge after decantation, containing approximately 50 per cent. of moisture, is then sluiced out with a weak cyanide solution into the intake of a centrifugal pump connected with the centre of the cone bottom, and transferred to another tank, known as the "first settlement tank." Here the charge is kept in circulation by means of a pump, then allowed to settle, as in the collector, and the gold-bearing solution is decanted off to the zinc boxes. This decanted charge is again transferred, subjected to a similar settling and decantation in a "second settlement vat," and finally discharged to the dam with water or a very dilute precipitated solution. Settlement in these tanks is hastened by the use of lime, which is applied in a variety of ways, being either periodically fed to the stamps or tube mills, or to the slime pulp in slaked form, by means of feed hoppers, or as milk of lime from a grinding pan. The limitations of decantation are obvious: The displacement of the dissolved gold is only practicable within certain economic limits, so that a certain definite gold loss in the final discharge to the dam must always be reckoned on. This loss is necessarily variable, depending upon capacity, difficulties in settlement, and general design of plant. On the other hand, the process is simple and comparatively inexpensive in operation, and, in spite of the losses through imperfect washing, is peculiarly applicable to the low-grade slime of the Rand. Even the advocates of more exact and positive methods of treatment must admit that in the latest and best designed decantation plants, in which large capacity is allowed for settlement and dilution, and all other conditions are favourable, the margin between results so obtained and the net results of filtration is not a wide one. The introduction of the so-called Usher process was an attempt to improve upon decantation by removing the gold-bearing solution by means of continuous upward displacement. The treatment tanks were provided near the bottom with a large number of perforated pipes radiating from a central upright pipe. The precipitated solution was introduced into this central main from a steady-head tank, and allowed to issue slowly through the holes in the radial pipes into the bottom of a partly settled charge. The speed of flow was just sufficient to keep the slime in suspension and permit of a clean overflow at the tank rim. The chief advantage claimed for this system was the reduction in plant required by reason of the time saved in avoiding decantation and settlement. But certain insuperable mechanical difficulties developed in connection with this process which offset its alleged advantages, and it was subsequently replaced by either decantation or filtration. The first important innovation in slime treatment was the introduction of the Butters vacuum filter in 1910. The essential features of this device are too well known to require description here. There was from the first no question as to the additional recovery obtainable by the filter; the doubtful point was whether the cost of operation would offset the gain in recovery to the extent of nullifying its advantages. This, however, has not proved to be the case. The prevailing cost of operating the filter on the Rand is from 2½d. (5c.) to 4d. (8c.) per ton of slime filtered, depending upon tonnage treated; and the additional gold recovered ranges from 6d. (12c.) to 2s. (48c.) per ton, depending upon the efficiency of the decantation plants superseded by the filter.

The vacuum filter is now generally admitted to be applicable in the following cases:—(1) Where it is desirable to extend a decantation plant of inadequate capacity or obsolete design; (2) where difficulties in settlement make it impracticable to use decantation without prohibitive extension of plant; (3) in all new plants. The most notable instances of (2) were the case of the Randfontein Central mill, where a comparatively new decantation plant treating 2,000 tons of slime per day was replaced by a Butters filter, resulting in a considerably increased recovery of dissolved gold; and the case of the Robinson Gold Mining Co., where the expenditure of £32,000 in 1911 on filter and Pachuca agitators resulted in an increased net profit of £2,500 per month. The Butters filter has been adopted in all new plants erected within the last five years. The following Rand mines have adopted the filter:—

Butters Filter Plants in the Witwatersrand District.

Plant.	Number of Filter Leaves.	Capacity. Tons per Day.
Crown Reef	310	900
Brakpan	348	1.000
New Modderfontein	348	1,000
Bantjes	240	600
Randfontein South	89	250
Robinson	468	1.350
Modderfontein B.	135	550
Langlaagte Estate	117	350
Crown Reef Extension	125	400
Randfontein Central	532	2.000
Van Ryn Deep	310	1,000
Geduld	190	500
Government Areas	412	1.300
Modderfontein Deep	250	700

The slime treatment in these modern plants consists in settling the slime in the same type of settlers as is used in decantation, namely, in tanks as large as 56 ft. in diameter, provided with cone bottoms, decanters, and overflow launders. When the charge is settled and decanted down to about 50 per cent. moisture it is transferred with cyanide solution to the Pachuca tanks. These tanks are of standard size, 15 ft. in diameter and 15 ft. deep, and hold between 80 and 100 tons of slime (dry weight), depending upon dilution. This agitator, requiring air representing in volume and pressure an expenditure of about 3 h.p., is considered, by reason of its simplicity and low operating and maintenance cost, to possess advantages over the various mechanical types, in spite of its great height. Agitation is continued from 6 to 8 hr., and the pulp is then transferred to a large storage reservoir, whence it is delivered to the Butters filter plant, as required. Two modifications of this procedure will be adopted in the next plant to be erected by the Rand Mines, Limited. The old system of intermittent slime settlement will be replaced by continuous settlement in Dorr thickeners. In trials conducted with this device it was found impossible to reduce the slime to the same low moisture as the intermittent system, without a much larger capacity than is allowed in American mills, where this device is chiefly applied to the much more simple settlement of slimed mill pulp containing a considerable quantity of fine sand. To compete with intermittent slime settlement on the Rand, a Dorr thickener 40 ft. in diameter cannot handle more than 150 tons of slime per day; but even so, in view of the labour and power consumption involved in handling intermittently settled charges, and the high capital cost of slime settlers, the continuous system would appear to possess distinct advantages. The continuous agitation of slime is made possible by the system just described, and is particularly well adapted to the newer plants where the height of the Brown agitators can be utilised for the required gravity flow into the Butters stock tank. This system of allowing pulp to flow slowly through a series of agitators was first applied in Mexico. Its first application on the Rand was at the East Rand Proprietary, about two years ago. It seems likely that all plants to be erected in the future will adopt continuous slime settlement and agitation, followed by vacuum filtration.

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* Paper read before the American Institute of Mining Engineers.

(To be continued.)

STOPING METHODS AND DRILLING PROBLEMS ON THE WITWATERSRAND.—II.

[By E. M. Weston.]*

Short versus Long Holes.—Consider how little the question of drilling more short holes against fewer long holes with piston or other drills has been studied, because the type of rig in use forced one method. Drilling speed varies nearly inversely as the area of the hole bored, or, in other words, it costs about the same in time and air used to excavate one cubic inch of rock as another. Except for the time lost in adjusting a drill and starting a hole, in the time during which one 8-ft. hole is drilled (drilling 2 ft. each with bits $2\frac{1}{4}$ in., 2 in., $1\frac{3}{4}$ in., and $1\frac{1}{2}$ in. diameter) we could drill nearly three 6-ft. holes (drilling 18 in. each with bits $1\frac{3}{4}$ in., $1\frac{1}{2}$ in., $1\frac{1}{4}$ in., and $1\frac{1}{8}$ in. diameter), or more by using 3-16 in. difference of gauge, which would be ample. We could also drill instead five 4-ft. holes starting $1\frac{3}{8}$ in. and drilling one foot with $1\frac{3}{8}$ in., $1\frac{1}{4}$ in., $1\frac{1}{8}$ in., and 1 in. bits each. Except, perhaps, in the case of stopes with large free faces, no convincing reasons can be given for confining the drilling to long holes with a large diameter at their bottom. Do we know just what are the factors that do or do not render it uneconomical to take down a small $2\frac{3}{4}$ in. stope drill and place it on another bar and arm which we could arrange to have rigged on another bench? Would it be possible to train whites and natives to an entirely different style of work? Would it not be wise to find out what are the precise conditions, including height of stope, dip of stope, character of ground interference of one hole with another, style of rigging up, and portability of machine, that make it wiser to drill one long hole against 2 to 5 shorter ones? One large hole will be or should be more wasteful of explosive than blasting using smaller holes. The amount of explosive needed varies as the square of the burden, and a hole with 3-ft. burden requires about nine times the explosive charge as that with a one foot burden. If we decide that it would be more economical to drill numerous short holes we must decide to adopt some way of doing this so that the holes do not interfere in any way with one another, that is that they do not spoil one another by breaking short, failing to come, or do not tear the burden off other holes, leaving their explosives to be wasted. If we decide that it is impossible to induce miners and natives to drill on two benches we need to ask if there be not a better way of rigging a machine for stoping than by using the same arm and bar as is used for development where the work is quite different, and if there is not a system of drilling holes that will enable a number of holes to be economically and quickly drilled from one bench. As a matter of fact, the prospect of a big advance lies along these lines, combined with a system of rigging machines before the actual drilling shift comes.

Skilled and Unskilled Labour.—There is another characteristic the ideal drill should possess for work on the Rand. Its manipulation should demand the minimum amount of intelligence and skill. This is essential. The drill must be as simple as possible, since natives have to do the actual running of it. This is, of course, not because it is not economical in all such work where expensive materials are employed to pay for and obtain the highest intelligence and skill procurable. If this lesson has not been learnt here it has been learnt in all the efficient countries of the world. There are no reduced costs or extra profits to be gained by reducing the rewards and incentives to the use of extra intelligence and skill, but the trouble is that the necessary skill and intelligence to work complicated machines for stoping is scarce or absent. The large and medium sized piston drill is a simple machine, and though his work is slow and inefficient unless under a skilled and vigilant white overseer, yet the Kaffir can and does run it fairly well. This is scarcely so with some types of more complicated hammer drills. The native requires closer supervision. The labour cost per fathom stoped is made up largely of the cost of white supervision, and the simpler a machine up to a certain point the more the cost of supervision may be spread over a number of machines. I am aware that this policy if carried too far may tend to defeat itself by lowering the drilling power of the various units, and I am afraid in certain cases it is being carried too far. With small-water feed hammer drills, which theoretically could be worked by one native, it was found that the drill speed could not be realised with one, and that in practice even more natives were required than with piston drills, and the white miner could supervise fewer of these machines than piston drills instead of more. This does not say that there may not be a design of hammer drill in existence or in preparation that will not prove a one-man drill easily supervised.

Labour Cost.—In two mines of the Far East Rand working under good conditions the cost of white labour is about 12s. per fathom or 10d. per ton. In a deep level mine running more small piston drills than large drills in stoping, the cost rises to 17s. per fathom, and the cost per ton broken to 2s. 4d. per ton. In another similar mine the figures are similar, but in another, where a large number of $2\frac{3}{4}$ in. piston drills are employed, they drop owing to the distribution of white labour over more drills to 11s. 6d. per fathom, and to 1s. 3d. per ton, and in another large property using some hammer drills for stoping the cost is 13s. 6d. per fathom and about 1s. 4d. per ton. Native labour in the East Rand mines costs under 6d. per ton, but in the other mines mentioned it varies from 1s. to 1s. 10d. per ton.

Cost of Air.—The cost of compressed air per large $3\frac{1}{4}$ in. rock drill shift varies considerably, depending on the efficiency of the compressor supplying it and the state of the pipes. On a large scale the cost of its production has been greatly reduced, and the average pressure supplied is maintained at a higher level in many mines. The cost of compressed air per shift will for large $3\frac{1}{4}$ in. machines be somewhere about 8s. per shift, being lower where air is cheaper. It may be taken that a rock drill like the Konomax, which achieves the limit in possible air-saving, represents a saving of 2s. to 3s. 6d. per shift. If a large rock drill breaks 8 to 14 tons per shift then the cost of compressed air would be somewhere between 6d. and 1s. per ton. The possible saving by using air expansively or by drilling smaller holes with smaller machines would be from about 2d. to 5d. per ton.

Cost of Explosives.—This is least with hand-drilling, more with small stope drills, and greatest with large machines drilling holes with larger burdens, as should be expected from the law governing the action of explosives. In the easy ground of the East Rand the cost is 12s. to 13s. 9d. for large machines per fathom broken, and 8s. 9d. for small machines. The cost per ton, however, in each case is just under 1s., which indicates poor efficiency for the smaller drills. It is 9d. per ton for rock broken by hand labour. In the harder ground and more difficult and steeper stopes of the Central Rand, explosives cost from 14s. 6d. per fathom where numerous $2\frac{3}{4}$ drills are employed to £1 per fathom, the cost per ton rises from 1s. 7d. to, where separate figures for large and small machines are not available, 2s. 10d. for large machines in a mine where stoping presents difficulties. In another mine, where a number of hammer drills are run with small piston drills, the cost is 15s. 6d. per fathom, and the cost per ton 2s. 4d. The explosives used per fathom in hammer stopes is as low as 6s. per fathom on the East Rand, as against 12s. for large machines, and all over the Rand runs from 9s. to 11s., per fathom on a stope width of 52 to 65 in. These figures go to show that the tremendous variations in cost of explosives on the same mines for machine stoping are not normal, and depend on other things than the character of the ground. The average stope width for large machines in the instances mentioned is about 70 in., for small machines 57 in., and for hand labour 58 in. One fact stands out strikingly in any review of Rand mining costs to-day with a view to their reduction, that the results obtained by hammer work show that if we could conduct our machine drilling to some extent on the same lines there is a possible saving of 6d. to 10d. per ton on explosive used. This is certain, not only on theoretical grounds, but is proved by the fact that on some mines, where this work is more efficient better results than the average to the extent of 6s. per fathom have been gained. It would, however, be a mistake to assume at once that the line of progress necessarily lies along such lines. Explosives are only one item of costs, and if the total production of tonnage per shift can be increased by using a few more pounds of explosive the costs per ton will be automatically reduced to a greater extent. We need to see the way to reduce explosives without reducing any other efficiency, and, if necessary, to be prepared to spend more on this item if we can reap adequate benefits from it. Nevertheless, it is obvious that great savings are possible in this item.

(To be continued.)

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*In the *Mining Magazine.*

Rhodesian Section.

RHODESIAN MINERAL OUTPUT FOR AUGUST.

Official Returns of Gold and Other Minerals from Southern Rhodesia for the Month

We have received for publication from the office of the Rhodesia Chamber of Mines, Bulawayo, the following detailed statement of the mineral output for the month of August, 1915, with comparisons and values:—

MATABELELAND.

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
BULAWAYO DISTRICT—				
Abercorn (W. J. Lane)	5	165	66·12	274
Do. (sands)	—	120	16·94	70
Agincourt (Hogg & Co.)	5	300	133·19	552
Alluvial (G. W. Anderson)	—	—	1·90	8
Antelope G.M. (Rhod.), Ltd.	2B 2P 2T	4,011	1,200·79	4,978
Do. slimes)	—	3.609	835·49	3,464
Antenior (W. J. Lane)	5	346	70·30	291
Do. (sands)	—	273	16·96	70
Basch (Morrison & Granger)	5	500	67·61	280
Do. (sands)	—	320	37·57	156
Bassick (Bassick Mine Syndicate (sands)	—	150	34·83	144
Bessie East (T. Berwitz)	2	145	29·99	124
Big Ben (W. E. Hunt)	4	200	75·56	313
Do. (sands)	—	440	96·03	398
Blanket (Blanket Syndicate)	15	1,061	152·16	631
Blue (J. Eisenhammer)	2	128	37·78	157
Bulawayo Main (Aserman and Cormack)	2	171	39·19	162
Do. (sands)	—	276	50·09	208
Bunny's Luck (W. H. Rabbetts)	2	400	179·56	744
Bushey Park (Robinson & Berwitz)	2	100	22·79	94
"C" (D. & C. Syndicate)	10	1,536	74·18	308
Do. (sands)	—	1,536	144·72	600
Carry (Boomerang Syndicate)	1 H	336	155·86	646
Do. (sands)	—	200	37·34	155
Camp (Carson Mines, Ltd.)	5	542	98·18	407
Do. (sands)	—	375	47·70	198
Cecil (Master Cecil Syndicate)	3	11	11·38	47
Claremont (T. J. Macfarlane) (sands)	—	1,092	30·99	129
Coquette (W. H. Robinson)	2	158	36·98	153
Cottage (Cottage Syndicate)	4	330	64·91	269
Do. (sands)	—	173	11·53	48
Dark Brown (R. Aserman)	5	100	50·00	207
Durban (Durban Syndicate)	2	180	218·44	905
Do. (sands)	—	100	86·27	358
Eagle A (Macdonald & Co.)	10	1,110	292·50	1.213
Do. (sands)	—	420	45·66	189
Edward (Warren & Guest)	5	336	77·05	319
Emva	5	35	9·49	39
Farvic (H. S. Henderson)	5	853	571·21	2,368
Do. (sands)	—	426	45·17	187
Fernando (Transvaal & Rhodesian Estates)	10 2P	1,750	648·92	2,690
Do. (sands)	—	1,750	336·66	1,396
Float (W. A. Foster)	2	8	5·72	24
Do. (sands)	—	66	16·89	70
Formby (Formby Syndicate)	3	281	154·03	638
Germania (A. G. Hadingham)	2	235	75·28	312
Godwin B (Barrett & Stacey)	5	160	111·08	460
Do. (sands)	—	330	41·55	172
Hildata A (R. Aserman)	5	467	87·43	362
Do. (sands)	—	320	59·47	247
I Alone (Huntley & Worthington)	(5)	375	46·19	191
Inspector (Inspector M. Syndicate)	3	57	29·92	124
Jeffs (Horton & Stewart)	3	91	104·51	433
Jumpers (J. P. McCay)	5	450	192·04	796
Do. (sands)	—	270	18·70	78
Kernel (E. Farrar)	5	180	46·42	192
Liberty (M. P. L. Syndicate)	1 H	64	28·45	118
Lone Hand (Armstrong & Furber)	5	412	217·10	900
Do. (sands)	—	278	45·39	188
Lonely Reef G.M. Co., Ltd.	20 3T	5.000	559·18	2,318
Do. (slimes)	—	5.000	2,174·05	9,012
Lonely Star (E. K. Jubber)	5	84	23·17	96
Mab (T. Berwick) (July & August)	1 C	500	167·48	694
Matabele 3 (Criterion G.M., Ltd.)	10	1.364	174·72	724
Do. (sands)	—	630	18·96	79
Matabele Queen's Co., Ltd.	10	1,870	401·54	1,665
Do. (sands)	—	1,870	363·51	1,507
Mamba	5	290	96·90	402
Do. (sands)	—	185	26·64	110
Margaretta	4	90	32·13	133
Mayfair and Maypole (Hicks and Arbery)	5	549	127·85	530
Do. (sands)	—	528	32·61	135
Mulloch	2	15	10·58	44
Nelly (F. D. Roscoe)	3 H	672	455·39	1,888
New Eclipse (J. R. Stewart)	5	677	229·71	952
Nicholson (Cunningham & Allison)	10 1C	1,543	191·78	795
Northern Star (N. Star Syndicate)	10	323	80·90	335
Do. (sands)	—	225	16·03	66
Northumberland	2	90	20·21	84
Oland (C. A. Hakanson)	2	155	44·70	185
Old Nic (Chart. & Gen. E. & F. Co., Ltd.)	15 4P	2,500	494·26	2,049
Do. (sands)	—	1,406	127·34	528
Olympus (Birthday Sd.), sands, July	—	2.900	29·75	123
Do. do. Aug.	—	1.600	99·88	414
Peach A	5	320	326·40	1,353
Do. (sands)	—	120	16·05	67
Princess 2 (C. A. Abbott)	2	84	20·90	87
Princess Olaf (K. Johnsen)	5	392	326·24	1,352
Queens West (Cummings & Berry)	3	210	89·11	369
Do. (sands)	—	418	47·40	196
Reward (J. Fritz)	2	6	3·53	15
Rewi (Intabanenda Syndicate)	5	280	120·26	499
Do. (sands)	—	350	40·81	169
Robin Hood (L. Granger)	5	500	94·95	394
Sabi Extra (I. Cook)	3	40	50·17	208
Slope 1. (E. E. Beecroft)	5	843	90·56	375
Star (Romola Nigel G.M. Co.)	5	350	84·36	351
St. Ives (Ettie Syndicate)	3	340	62·44	259
Stock's Luck (Smith & Ryan)	5	106	67·33	279
Teutonic (Bonshor & Battersby), July	5	280	100·44	417
Do. (B. & B. Syndicate), August	—	500	97·51	404
Winifred (Exchange Syndicate)	5	200	42·82	178
Do. (sands)	—	110	12·46	52
Wolley Dog (P. H. Davis)	2	344	387·39	1.606
Bulawayo district total			15,620·56	64,753
GWELO DISTRICT—				
Alderman (Williams & Woodger)	3	150	43·16	179
Bedad (A. & B. Syndicate)	5	300	62·79	254
Do. (sands)	—	360	23·71	98
Bell Reef Dev. Co., Ltd.	2B 1T	2.964	1.263·43	5,238
Bonsor B323 (Cornish Syndicate)	10	994	180·79	749
Do. (sands)	—	900	80·85	335
Bonsor B 327	10	750	99·88	414
Camelia (S. Levin)	10	1.531	335·35	1,390
Do. (sands)	—	620	57·24	237
Cactus (Renton & Gray)	5	352	69·05	286
Do. (sands)	—	330	47·13	195
Cissy (G. Nicholson)	1 H	194	26·76	111
Collingwood (Pini & Wearing)	5	490	29·41	122
Do. (sands)	—	530	43·33	180
Csardas (Wolfshall Syndicate)	10	585	524·38	2,174
Do. (sands)	—	420	101·18	419
Do. (slimes)	—	165	15·84	66
Dream (Dream Trib. Syndicate)	5	60	36·42	151
Do. (sands)	—	40	74·98	311
Eileen (M. L. Price)	5	280	24·53	102
Emerald (Boston & Flann)	2	250	98·71	409
Do. (sands)	—	200	23·37	97
Falcon Mines, Ltd.	28 3T	14,354	3,264·98	13,713
Do. Copper, £15,224.				
Fed Up (A. Malcolm), July-August	5	374	144·01	597
Gaika G.M. Co., Ltd.	5 1C	3,264	1,472·62	6,185
Do. (sands)	—	1.139	85·06	357
Do. (slimes)	—	1.740	148·00	622
Glen Hume (Hume, Withey and Walker)	5	810	130·45	541
Glen Rosa (Glen Rosa Syndicate)	5	713	825·47	3,422
Do. (sands)	—	475	241·42	1,001
Globe & Phoenix G.M. Co., Ltd.	40 10P	6,245	5,675·89	23,839
Do. (sands)	—	1,912	1,016·65	4,270
Do. (slimes)	—	2.227	432·33	1,816
Do. (concentrates)	—	240	444·40	1,866
Gothic & Pagamesa (W. H. Peard)	15 2P	693	293·12	1.215
Do. (sands)	—	867	123·93	514
Gretna Green (M. L. Price)	(5)	450	55·81	231
Impali (Bolt & Franks)	—	586	81·85	339
Do. (sands)	—	500	14·93	62

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Jester (A. E. West), July	5	175	22·03	91
King Solomon (A. E. West)	(5)	235	36·81	153
Leopard (Leopard Trib. Syndicate)	5	670	111·71	463
Meg (I. M. Haxnar)	2	580	65·41	271
Moss (Exploring L. & M. Co., Ltd.)	5	913	464·54	1,926
New Dunraven G.M. Co., Ltd.	5	867	105·30	437
Do. (sands)	—	680	39·16	162
Pacific (Wanderer Sel. G.M., Ltd.)	—	283	31·50	131
Pondo (F. C. Luxat)	5	560	227·29	942
Do. (sands)	—	280	38·65	160
Rambler (G. G. Grant)	2	20	6·93	29
Romney (T. Pedlow)	5	297	97·87	406
Selukwe-Columbia G.M., Ltd—				
Danga	10 1P	80	26·34	109
Do. (sands)	—	44	9·60	40
Wonderland	—	1,253	405·48	1.681
Do. (sands)	—	691	147·89	613
Yankee Doodle	10	1.466	249·32	1,034
Do. (sands)	—	1,012	102·00	424
Shamrock (Crampin & Masters), July	10	700	50·35	209
Shamrock (Crampin & Masters), August	—	1,000	102·26	423
Tebekwe (A. N. Tyrrell)	20	2,700	385·48	1.598
Do. (sands)	—	1,050	104·18	432
Taxul (F. C. Luxat)	1 11	680	90·82	376
Do. (sands)	—	500	42·02	174
Trepolpen (C. T. Uren)	2	18	6·58	27
Veracity (L. R. Evans)	2	175	132·12	548
Walrus (J. Jones), July & August	—	180	58·06	241
Wanderer (Selukwe) G.M., Ltd.	4GR	11,249	1,148·77	4,762
Zabonkwe (Helmes & Urquhart)	5	780	47·30	196
Do. (sands)	—	620	87·77	364
Gwelo district total			22,156·75	£92.526
Matabeleland total			37,777·31 ozs.	
Value			£157,279	

MASHONALAND.

Hartley District—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Agnes (P. S. Triggs)	5	930	233·81	969
Do. (sands)	—	550	49·66	206
Arlandzer (Keir & Rooke)	10	1,700	78·55	326
Do. (sands and slimes)	—	1.700	313·70	1,301
Amarosa S. (C. H. Weildon)	(5)	37	11·63	48
Baltimore & Virginia (P. A. Enke)	5	535	49·13	204
Bijou (G. Hawkins)	2	20	42·84	178
Bonheur (T. H. Long)	2	120	130·82	542
Brilliant (Mabel's Luck Synd.)	5 1P	913	130·13	540
Do. (sands and slimes)	—	903	97·98	406
Buffalo (E. A. Begbie)	5	345	84·36	350
Brompton (R. R. Aitken)	5	725	113·34	470
Do. (sands)	—	500	42·53	176
Cam & Motor G.M. Co., Ltd.	Roasting	12,849	4.850·38	20.566
Do. (slimes)	—	512	77·35	328
Chadshunt (C. H. Weildon)	5	327	254·91	1,057
Do. (sands)	—	272	45·28	188
Cheshire Cat	5 1P	140	30·54	147
Do. (sands)	-	140	16·21	68
Concession Hill & W. Ext. (C. E. Simpson)	5 1C 2P	1,733	349·20	1,448
Do. (sands)	—	1,010	59·69	247
Dalny (Macdonald & Sale)	1 C	1,574	70·53	292
Do. (sands)	—	1.554	167·79	696
Dalny 1 W. (Macdonald & Sale)	5	500	54·15	224
Do. (sands)	—	300	39·80	165
Dawn (Arrow Syndicate, Ltd.)	5	606	298·79	1.239
Do. (sands)	—	606	33·84	140
Eiffel Blue (Willoughby's Cons. Co., Ltd.)	10	1.338	634·99	2,632
Do. (sands)	—	780	46·96	195
Eileen Alannah Mining Co., Ltd.	12 2T	3,387	550·66	2.283
Do. (sands)	—	4.278	1.500·94	6.222
Enney Ext. E. G. Goodyer)	5	520	150·08	622
Do. (sands)	—	350	32·45	134
Giant Mines of Rhodesia, Ltd.	30 2T	5.800	1,162·34	4.781
Glasgow Mines, Ltd.	5	546	124·88	518
Do. (sands)	—	280	40·75	169
Glasgow I. & 3 (R. McInnes)	2	175	64·71	268
Glencairn (Glenrosa Mines, Ltd.)	5	792	1,189·91	4,933
Golden Valley (J. Mack)	10	1.280	527·43	2,186
Do. (sands)	—	683	112·19	465
Guelph (J. & M. Davidson)	3	125	36·69	152
Hepworth (V. L. Synd.), sands	—	620	33·17	137
Inez (Harrill & Smith)	10	1.220	158·00	655
Do. (sands)	—	840	28·09	116
Kanyemba (Kanyemba Syndicate)	10	1,114	495·03	2.052
Do. (sands)	—	700	101·10	419
Masterpiece (J. McAdams)	5	294	84·38	350
Do. (sands)	—	744	45·56	189
Mudale (E. A. McDowell)	5	300	96·44	400
Old Chum (W. H. Halkett)	5	500	64·23	266
Do. (sands)	—	400	26·24	109
Oleander (O. T. de Villiers)	3	350	86·07	357
Do. (sands)	—	300	33·96	141
Owl (A. Rolfe)	10	1,589	710·56	2,946
Do. (sands)	—	1,780	536·82	2,225
Pickstone Gold Mines, Ltd.	10 1C	818	41·23	171
Do. (sands and slimes)	—	1,281	79·08	328
Pomposa (J. Knott)	5	168	47·18	196
Poverty (D. J. Laing)	5	627	151·64	629
St. George (Hussey & Fraser)	2	150	51·85	215
St. Louis (Smith & Heard)	2	72	35·36	147
Seigneury (Seigneury Syndicate)	10	1.056	168·58	699
Do. (sands)	—	800	20·88	87
Seven Sisters (7 7's Syndicate)	3	177	37·26	154
Shepherds (Phoenician (Rhod.) Co., Ltd.)	5 1T	1.100	213·30	884
Do. (sands)	--	1,100	147·28	611
Thistle-Etna G.M., Ltd.	1 C	2,150	435·71	1,808
Do. (sands)	—	2.140	141·89	589
Victoria 1 (Crown Syndicate)	4	75	10·80	45
Village Main (Bruce & Buchanan), July	(5)	320	59·45	246
Village Main (Bruce & Buchanan), August	10	540	86·37	358
Washington (I. J. Minnaar)	5	400	101·83	422
Do. (sands)	—	310	15·11	63
What Cheer (H. Moser)	5	406	282·20	1,170
Do. (sands)	—	650	92·91	385
Hartley district total			18,621·48	77,646

Lomagundi District—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alluvial (A. Smith)	—	—	·99	4
Alluvial (G. Blacklaws)	—	—	32·53	135
Alluvial (E. A. Warry)	—	—	3·12	13
Alluvial (R. G. Harding)	—	—	19·08	79
Alluvial (P. J. Purcell)	—	—	3·50	14
Colorado (Diggers Synd.), sands	—	152	11·08	46
Eldorado Banket G.M. Co., Ltd.	20 1C 4P	4,090	1,612·97	6.774
Do. (sands)	—	3,949	805·49	3,383
Golden Kopje Prop. Mines, Ltd.	50 3T	10,020	702·27	2,950
Do. (slimes)	—	9,970	2,962·24	12,441
Golden Butter (Chiriva Syndicate)	—	294	60·62	251
Lone Hill (Day & Hallward)	2	42	28·66	118
May (May Syndicate)	5	403	71·81	298
Do. (sands)	—	240	58·61	243
Medway (F. L. Standen)	5	663	128·45	533
Mediteraneo (J. Perhat)	2	80	45·33	189
Lomagundi district total			6.546·75	27,471

Mazoe District—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Bella Donna (R. Ricardo)	1D	29	3·84	16
Botha II. (London and Rhodesia Mining and Land Co.)	1 H	2.364	47·14	195
Do. (sands)	—	578	48·27	200
Chin (Arrow Synd., Ltd.), sands, July	—	836	89·11	369
Chin (Arrow Synd., Ltd.), sands, August	—	582	40·83	169
Day Dawn (Day Dawn Tribute)	2	316	72·94	302
Do. (sands)	—	231	52·41	217
Goth B. (Currell & Cooke)	—	—	24·99	104
Jumbo G.M. Co., Ltd.	20	1.886	391·15	1.621
Do. (sands)	—	1,107	97·46	404
Do. (slimes)	—	779	80·96	336
Kingsley Hoard (A. S. Warwick)	5	254	52·05	216
Kimberley (Mash.) G.M. Co., Ltd.	8 2T	4.300	1,063·37	4.510
Do. (sands)	—	1,950	284·26	1.206
Do. (slimes)	—	2,350	251·84	1.068
Micky (Micky Syndicate)	2	323	75·36	312
New Darwin (Howard & Southey)	2	110	26·12	108
Promoter (F. C. Croxford), July	1 C	2.643	85·78	356
Do. (sands)	—	1,058	31·12	129
Do. (August)	—	2.268	79·81	331
Do. (sands)	—	1,100	58·55	243
Reno (Jumbo G.M. Co., Ltd.)	—	414	85·86	356
Do. (sands)	—	243	21·42	89
Do. (slimes)	—	171	17·76	74
Rhino (Giles & Southey)	2	100	5·46	22
S.D.C. 3 E. (B. G. Byerley)	1 11	1,148	53·47	222
Shashi (C. Laland)	2	105	18·61	77
Syrian (F. A. Badenhorst)	3	45	15·09	65
Tat (W. M. Epton)	5	369	102·46	425
Do. (sands)	—	220	23·49	97
Venus (Giles & Southey)	2	50	55·69	230
Yellow Jacket (J. J. Barger)	—	—	8·69	36
Mazoe district total			3,365·36	14.103

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
SALISBURY DISTRICT—				
Alpes (P. Zaffere)	5	225	182·61	756
Do. (sands)	—	432	107·01	443
Arcturus (L. Chiappini), sands	—	500	59·51	247
Ceylon (Ceylon Syndicate)	5 1P	859	162·16	672
Do. (slimes)	—	859	188·30	781
Cross-your-luck (Seb. and District Mines)	2 1P	105	22·03	91
Do. (sands)	—	291	122·12	506
Found A. (Grey's Syndicate)	2	200	193·53	803
Do. (sands)	—	220	74·29	308
Inyague 3 (P. L. Peters)	2	40	22·30	92
Joking (Harrison & Drabble)	2	294	137·78	571
Do. (sands)	—	264	68·43	284
Kenilworth (K. Syndicate)	2	183	50·97	211
Koodoo (Est. R. Tyron)	5	428	183·16	759
Do. (sands)	—	620	116·40	483
Louise Grand (H. S. Plant)	1 H	800	48·01	199
Do. (sands)	—	650	28·47	118
Mont d'Or (Claxton & Bussell)	5	240	71·48	296
Do. (sands)	—	255	229·99	95
New Agnes (Fungwe Dev. Synd.)	5	186	41·21	171
New Full Back (N.F.B. G.M. Syd.)	2	279	53·46	222
Planet (Planet Tribute Syndicate)	10 1P	1,200	286·73	1,189
Do. (sands)	—	1,200	229·89	953
Radnor I. (London and Rhodesia Mining and Land Co.)	5 2P	1,086	307·55	1,275
Runaway (Tarr & Fulton)	D	11	4·50	19
Shamva Mines, Ltd.	56 8T	49,263	2,828·73	11,881
Do. (sands)	—	23,378	2,981·50	12,522
Do. (slimes)	—	27,215	3,471·97	14,583
Southern Cross (H. G. Bateman)	1 D	51	20·92	87
Sparti (Sparti Syndicate)	—	—	8·12	34
Salisbury district total			12,096·13	50,651
UMTALI DISTRICT—				
Bartissol (Umtali Waterfall Synd.)	10	931	127·65	529
Do. (sands and slimes)	—	930	91·05	378
Champion 193 (J. Buchanan)	5	602	82·56	342
Do. (sands)	—	458	35·90	149
Constance A. (J. F. Kapnek)	5	1,130	196·00	812
Do. (sands)	—	150	12·78	53
Golden Frog (W. A. Hoole)	1 C	110	12·81	53
Inca (F. Young)	5	310	59·98	249
Kent Mines, Ltd. (concentrates)	—	—	81·36	337
Liverpool (R. G. Snodgrass)	5	684	116·73	484
Do. (sands)	—	200	19·06	79
Montezuma G.M. Co., Ltd.	10 1P	1,070	190·81	791
Pilgrim 2E (O. R. Cawood)	5	550	72·14	299
Do. (sands), E. K. Evans	—	1,330	33·61	139
Rezende Mines, Ltd.	60	9,700	1,235·32	5,242
Do. (sands)	—	3,338	294·36	1,249
Do. (slimes)	—	1,568	121·88	517
Do. (concentrates)	—	2,013	482·34	2,031
Two Sisters (Mrs. Harris)	2	50	9·47	39
Umtali B (Umtali Waterfall Synd.)	10	248	32·56	135
Do. (sands and slimes)	—	248	25·10	104
Umtali district total			3,333·47	14,011

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
VICTORIA DISTRICT—				
Empress (S.A. Pros. and Con. Syndicate)	8	1,500	179·19	743
Do. (sands and slimes)	—	1,460	126·19	523
Ruby (E. Frankis)	5	120	27·40	114
Sunbeam (Douglas & Durrell)	5	700	252·37	1,046
Texas (P. S. Warder)	10	200	163·80	679
Do. (sands)	—	200	26·69	111
Wake Up, John (J. S. Hemlock)	2	92	28·43	117
Victoria district total			804·07	3,333

Mashonaland total	44,767·26 ozs.
Value	£187,214
Grand total	82,544·57 ozs.
Value	£344,493

C: Chilian Mill. T: Tube Mill. G.R: Gates Roll. H: Huntington Mill. P: Grinding Pan. Pn: Pneumatic Mill; D: Dolly.

TOTAL MINERAL OUTPUT.

		Value.
Gold, ounces	82,544·57	£344,493
Silver, ounces	16,829·53	1,487
Coal, tons (sales)	38,143·00	11,721
Copper, tons	321·47	16,074
Chrome iron	4,271·09	9,540
Asbestos, tons	459·67	7,355
Lead, tons	3·26	65
Diamonds, carats	26·5	58
	Grand total value,	£390,793

GOLD OUTPUT COMPARISONS.

	Ounces.
October, 1914 (previous record)	81,165·02
August, 1915	82,544·57
Increase	1,379·55
August, 1915	82,544·57
July, 1915	80,669·14
Increase	1,875·43

ASBESTOS YIELD.

	Tons.	Est. value.
King's Asbestos (Rhodesia), Ltd.:		
July	154·25	£2,468
August	153·25	2,452
Victoria (Rhodesia) Asbestos, Ltd.:		
July	65·00	1,040
August	43·00	688
Balmain (Mrs. Goddard)	25·00	400
Regina (P. A. Nightingale)	19·17	307
Totals	459·67	£7,355

Grand total output to date:—Gold, 7,860·459 ozs., value £31,360,252; silver, 1,986,797 ozs.; lead, 7,088 tons; copper, 3,648 tons; chrome iron, 359,638 tons; coal, 2,184,242 tons; tungsten ores, 129·10 tons; antimony, 13·75 tons; arsenic, 76 tons; asbestos, 2,680 tons; diamonds, 10,688·75 carats; other precious stones, 90,069·50 carats.

New Registrations.

The following new companies have been registered during August:—

The Kensington Steam Bakery, Ltd., 28 Argyle Street, Kensington, Johannesburg; capital £1,000.

The Valod Trading Co., Ltd., 48 Commissioner Street, Krugersdorp; capital £500.

African Film Productions, Ltd., Empire Buildings, Market Street, Johannesburg; capital £25,000.

The Sinclair Grain Export Co., Ltd., 97 and 98 Standard Bank Buildings, Commissioner Street, Johannesburg; capital £1,000.

The Ama Drug Co., Ltd., 14 Melle Street, Johannesburg; capital £100.

The South African Co-operative Stores, Ltd., corner of Diagonal and Jeppe Streets, Johannesburg; capital £500.

Nana, Ltd., Boschhoek, P.O. Boschhoek, District Rustenburg; capital £250.

Northern Trust Co., Ltd., 8 Standard Bank Chambers, Johannesburg; capital £2,000.

Northern Alluvial Tin Diggings, Ltd., 16 Bettelheim Buildings, Fox and Simmonds Streets, Johannesburg; capital £1,000.

William Chapman, Ltd., Erf 112, Lombard Street, Potchefstroom; capital £3,000.

Ghazipur Co., Ltd., corner of Von Brandis and Long Streets, Albertville Township, Krugersdorp; capital £3,000.

The Letaba Tributing Co., Ltd., Premises of H. Kroomer, Denver, near Johannesburg; capital £600.

The Lewis Rand Prospecting and Gold Mining Syndicate, Ltd., office of Fred. Haselden, Barberton; capital £1,440.

Sharp's, Ltd., 53 Simmonds Street, Johannesburg; capital £2,500.

Angehrn Estates, Ltd., corner of Bree and Melville Streets, Newtown, Johannesburg; capital £30,000.

Angehrn's Cold Storage, Ltd., corner of Bree and Melville Streets, Newtown, Johannesburg; capital £50,000.

South African Periodicals, Ltd., 16 Simmonds Street, Johannesburg; capital £500.

NOTICES OF INCREASE OF CAPITAL.

Transvaalse Landbouwers Arbeids Maatschappij, Beperkt, Bethal; increased from £600 to £4,000.

W. E. Hortor & Co., Ltd., Johannesburg; increased from £20,000 to £66,000.

Boksburg Brick and Fireclay Co., Ltd., Johannesburg; increased from £2,110 to £2,210.

African Realty Trust, Ltd., Johannesburg; increased from £25,000 to £100,000.

HIGH MINING SALARIES.

Study for Certificates as Mine Captains, Mine Managers, Surveyors, Mechanical and Electrical Engineers, and Engine Drivers. Private Tuition and Correspondence Lessons, where personal tuition is impracticable. Practical Mathematics and Electrotechnics. E. J. MOYNIHAN. Consulting Engineer, Cuthbert's Buildings, Corner of Eloff and Pritchard Streets, Johannesburg. 'Phone 3664.

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Dr. Mellor's Rand Geology.

To the Editor, *South African Mining Journal.*

Sir,—Dr. Mellor says, in his concluding paragraph, under the heading, "The Upper Witwatersrand System," in your last issue, that "the continuity of the reef from the Blue Sky . . . has been demonstrated by innumerable boreholes and shafts with a completeness that must be rare in mining experience." I have carefully followed these shafts and boreholes from the early days, and my conviction is that ninety per cent. of them have been put down in Black Reef series of the Black Reef age, which covers nearly the whole of that country, overlaid with our coal measures. The Blue Sky Reef is well known and easily recognised wherever our Witwatersrand age appears, but its average value compares unfavourably with that of the disowned Black Reef with which nature has so bountifully blessed the Far East Rand. If the Cason and Blue Sky are working Main Reef Leader with a shale footwall (slate according to Dr. Mellor), how is it, may I ask, that the Cinderella Deep G.M. Co. on the dip, which is supposed to have been working on the same reef (Main Reef according to Denny) is devoid of that remarkable adjunct?—Yours, etc.,

SCOTT ALEXANDER,
"Rand Stratigraphist."

Johannesburg,
September 29th, 1915.

The Geological Museum.

To the Editor, *South African Mining Journal.*

Sir,—The following appeared in the *Rand Daily Mail* of the 28th inst.:—"With regard to the article in yesterday's *Daily Mail* upon the Geological Museum, we are informed that, whatever action is taken in the matter of the Town Council's annual grant, the museum will not be closed. Prospectors and other who desire to use the museum will merely have to call upon Dr. Corstorphine or Professor Young at the School of Mines, University Buildings, to obtain all the information they require." From this it appears that should the municipal grant to the museum be continued there will be no Curator. The present Curator has been in the museum for the last ten years, and a dismissal after so many years of faithful service seems anything but fair treatment. I do not think, as a mineralogist, a better man than the retiring Curator can be found in the country. Both Dr. Corstorphine and Professor Young are eminent geologists and mineralogists, but it is hardly likely that prospectors and others will hang about the University College on the chance of seeing them while they have their official and professional duties to attend to, and when these are over neither Dr. Corstorphine nor Professor Young will appreciate being worried by the public. Such a scheme is not workable. With a Curator on the spot, he can be consulted at once, and the applicant, with the contents of the museum in front of him can be put on the right way without further wasting his or any one else's time, hence it is to be hoped that should the municipal grant be continued no change will be made in regard to the Curator. This hope, I am confident all prospectors and others interested in minerology in the Union and even beyond the Union's borders, will endorse. At present the museum belongs to the Geological Society, but should rightly belong to the municipality in the same way as the parks, zoological gardens, etc., do. Perhaps some of our Town Councillors will interest themselves in the matter and take the necessary steps to bring this about.—Yours, etc.,

"PROSPECTOR."

The State of the Labour Market.

The August report of the Department of Mines and Industries reflects much more activity in the labour market than in the previous month. During August there were in the four centres in the Union 712 applications for employment, an increase of 115 on the figures for July. The Department found employment in August for 234 persons, an increase of 146 on the previous returns. Commenting on the Johannesburg returns, the report says:—"The return of those on active service increased the number of applications for work, as a large number who volunteered for military duties had no guarantee of employment on their return." Apart from internal troubles within the Union, unemployment would have been much more prevalent during the war period owing to the general collapse in business and entire stoppage of some of the largest industrial concerns in the country had it not been that many were engaged on military duties. The improvement in trade, which has gradually been taking place, is doubtless restricted to some extent by the increased prices on imported commodities and also affected by uncertainty in delivery of material. Dealing specifically with Rand industries, the report says in the buildings trades conditions continue to improve, but there was a decided increase during the month of men available for openings. Allied building trade activities were more extended in opportunities for labour, though the class of work was chiefly on small buildings. Engineering was fairly active. Heavy plate workers were fairly well employed, and might be better if supplies and cost of material were more reliable. Furniture making is on the increase; bootmaking and tailoring "busy" to "very busy," and tinplate work is active. Commenting on the Pretoria position, the report says that during the past two months a marked increase is shown in the number of written applications in country districts of this and other Provinces, most of these applicants being bricklayers, masons or unskilled labourers. On August 23rd arrangements were completed for giving road relief work to 63 additional men. Forty men were engaged as labourers on the Government Farm Settlement at Modderfontein. The Cape report states that employers who have lost men proceeding with the Overseas Contingent are endeavouring to avoid engaging substitutes. In the engineering trades there was actually a shortage of skilled workers, such as lathe hands, blacksmiths, boilermakers, and shipwrights. The unemployed at present comprise carpenters, painters, bricklayers, compositors, engine drivers, quarrymen, railway labourers, hotel workers, overseers, clerks and storemen, and there are also "many middle-aged men of nondescript occupations."

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

THE WEEK IN THE SHAREMARKET.

Stronger and More Active—Excellent Effect of the War News.

Resulting from the excellent war news received on Monday, the market took a distinct turn for the better this week. All the leading favourites were in demand, and the list of stocks dealt in lengthened considerably. With a continuance of favourable news, prices must, of course, improve, and the outlook may therefore be said to be better than it has been for some months. Mr. Dawe's cheerful speech at the Chamber of Mines, on Monday, is another good feature. Gedulds have had a special rise on the week, due to the anticipation of the announcement regarding the increase in plant.

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	Fri., 24th.	Sat., 25th.	Mon., 27th.	Tues., 28th.	Wed., 29th.	Thurs., 30th.
Adair-Ushers	—	0 3*	—	0 3*	—	0 5*
African Farms	7 3*	7 3*	7 5*	7 5*	7 4*	7 4*
Apex Mines	16 6*	—	16 6*	17 0*	16 9*	16 9*
Aurora Wests . . .	—	—	8 0*	8 0*	8 0*	8 0*
Bantjes Cons. . . .	—	6 3*	—	—	6 3*	6 0*
Brakpan Mines . . .	57 0*	59 0†	59 0†	60 0	59 6*	60 0*
Breyten Collieries. .	21 0*	21 0*	21 0*	21 0*	21 0*	21 0*
Brick and Potteries.	5 0*	5 0*	5 0*	5 0*	5 6*	5 0*
Bushveld Tins . . .	—	—	—	—	0 6†	—
Cassel Coals	—	21 0†	—	—	—	18 9*
City and Subs. . . .	42 0*	42 0*	42 0*	42 6*	42 0*	42 0*
City Deeps	62 0*	63 0	64 0	64 0*	64 6†	61 0*
Cloverfield Mines . .	5 4*	5 3*	5 4*	5 7	5 8	5 7*
Clydesdale Collieries.	—	12 0*	—	12 0*	12 0*	12 0*
Con. Gold Fields . .	—	24 0†	—	—	—	24 0†
Con. Investments . .	—	—	—	—	—	16 0†
Con. Langlaagtes. . .	37 0*	37 0*	38 0	38 6*	38 3*	—
Con. Main Reefs . .	18 0*	18 0	18 6*	18 9	18 9	19 0
Con. Mines Selection	9 3*	9 0	9 3*	9 3*	9 3*	9 3*
Coronation Collieries	—	27 6†	27 6†	27 6†	—	26 6†
Coronation Freeholds	0 4†	0 2*	0 4†	—	—	—
Crown Mines Deb. .	£98*	£98*	£98*	£98*	£98*	£93*
East Rand Centrals	2 11†	—	2 9*	2 9*	3 0†	2 10*
East Rand Coals . .	1 9*	1 10*	1 10*	1 10*	1 11	1 10*
East Rand Deeps . .	1 3*	1 3*	1 3*	1 3*	1 3*	1 3*
East Rand Props. .	—	—	20 0*	21 0	20 6*	22 0
East Rand Debs. .	£85*	£85*	—	£85*	£85*	£85*
Eastern Golds . . .	1 2*	1 0*	1 2*	1 2*	1 3	1 3*
Ferreira Deeps . . .	—	38 0*	—	—	—	—
Frank Smiths Dmds.	1 3*	1 3*	1 3*	1 4*	1 4	1 3*
Geduld Props . . .	29 0	29 6*	30 0*	30 9*	33 6	33 3
Glencairns	2 0*	2 0*	—	2 1*	2 1*	2 1*
Govt. Areas	22 9	23 0	24 0	23 6*	23 9*	24 6*
Jupiters	6 6	—	6 2*	6 1*	6 0*	6 0*
Klerksdorp Props. .	1 6*	1 6*	1 7*	1 6*	1 6*	1 6*
Knight Centrals . .	9 10	9 10	10 0	10 0	10 5	10 10
Lace Props.	3 1*	3 0*	3 5*	3 4*	3 4*	3 6*
Luipaardsvlei Est. .	7 0*	—	—	7 3*	7 3*	7 6*
Lydenburg Farms. .	3 10*	3 9*	3 9*	3 9*	3 9*	3 11
Main Reef Wests. .	6 6*	6 6*	7 0*	7 3	—	7 0*
Meyer & Charltons .	—	—	100 0*	100 0*	100 0*	—
Middelvlei Estates .	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Modder B.'s	108 0*	—	108 9*	115 0B	112 6	112 6B
Modder Deeps . .	95 0*	95 0*	96 9	98 0	97 0*	96 6*
New Boksburgs . .	—	—	0 10*	—	0 10*	0 10*
New Eland Diam'ds	10 0†	10 0†	10 0†	—	10 0†	5 0*
New Era Cons. . . .	6 10†	6 9†	6 7*	7 0†	6 9*	6 9*
New Geduld Deeps.	2 3*	2 4*	2 4*	2 4*	2 4*	2 5*
New Goehs	—	—	13 6*	13 6*	13 6*	13 6*
New Heriots	—	57 6*	—	57 6*	57 6*	57 6*
New Kleinfonteins .	22 6	22 6*	23 6	23 9*	23 9	23 9
New Modders . . .	292 6*	295 0*	297 6*	317 6	317 6*	317 6*
New Primrose . . .	—	8 0*	—	8 0*	8 0*	8 0*
New Rietfonteins .	—	—	1 0†	—	—	0 3*
New Unifieds . . .	16 0	15 9*	15 9*	16 0*	16 0*	16 6*
Nourse Mines . . .	—	20 0†	20 0†	—	—	—
Orange Diamonds. .	—	—	0 3†	—	—	—
Pretoria Cements. .	—	42 6*	42 0B	—	—	—

A Ex London. B Odd lots. * Buyers. †Sellers.

	Fri., 24th.	Sat., 25th.	Mon., 27th.	Tues., 28th.	Wed., 29th.	Thurs., 30th.
Princess Estates . .	—	—	—	2 6*	2 9*	2 9*
Rand Klips	3 10	3 10*	3 11*	3 11*	4 0*	4 0*
Rand Nucleus	—	1 6†	1 4*	1 4*	1 4	1 4*
Randfontein Deeps .	2 6*	2 6*	2 9*	2 9*	2 9*	2 9*
Randfontein Est. . .	12 9*	—	—	—	—	—
Robinson Deeps. . .	—	—	24 0†	23 6†	23 6†	
Rooibergs	14 0*	14 0	14 3*	14 6*	—	15 0†
Roodepoort Uniteds.	—	3 0*	3 0*	3 0*	3 0*	3 0*
Ryan Nigels	—	—	2 6*	2 6*	—	2 6*
Shebas	2 3†	2 0†	2 3†	—	2 3†	2 3†
Simmer Deeps . . .	1 9†	1 9*	1 6*	1 9†	1 9†	
S.A. Breweries . . .	31 0*	31 0*	31 0*	31 0*	31 0*	31 0*
S.A. Lands	2 6*	2 7*	2 7*	2 7*	2 7*	2 7*
Springs Mines . . .	23 9	24 0	25 3	25 3	25 6	25 0*
Sub Nigels	9 0*	—	—	10 9*	11 0†	10 6*
Transvaal Coal Trust	37 0*	38 0*	36 6*	—	37 6*	37 0*
Transvaal Lands . .	10 6*	11 0	11 0*	—	11 0*	—
Trans. G.M. Estates	—	29 0†	28 6†	28 0	28 3*	28 6*
Van Ryn Deeps . .	50 0*	50 0	51 0	51 3	50 6*	50 6*
Village Deeps . . .	33 6*	33 6*	35 0†	33 6*	35 0†	—
Vogel Con. Deeps .	0 9†	0 9*	0 3*	0 6†	1 0†	0 8*
Welgedachts . . .	13 0*	14 0*	14 0*	—	13 0*	—
Western Rand Est.	0 9*	—	—	—	—	—
Witwatersrands . . .	—	50 0*	50 0*	51 0*	51 0*	50 0*
Wit. Deeps	26 0*	26 0*	26 9*	26 0*	26 9*	26 9*
Wolhuters	12 0†	12 0†	12 3†	12 3†	12 0†	12 0†
Zaaiplaats Tins . . .	15 6	15 9	15 9	14 9*	15 0	14 6

A Ex London. B Odd lots. * Buyers. †Sellers.

Knight Central.

Seventeenth crosscut west shaft, south of dyke, South Reef intersected; four samples averaged 8·3 dwts. over 12 inches.

Village Main Reef.

The profit earned by the Village Main Reef in the June quarter amounted to £77,540. The ore received from mine was 110,601 tons; waste sorted out, 16·9 per cent.; tonnage crushed, 92,450 tons; number of stamps operating, 160 stamps; number of tube mills operating, 4 tube mills. Value of ore before crushing (reflected by mill yield and value of pulp):—Mill yield per ton, 23s. 8d.; assay value of pulp, 11s. 6d.; total, 35s. 2d. (The values per ton are calculated at 84s. per fine oz.) Total yield, 37,244 ozs. fine; total yield per ton, 33s. 8d. Results from last quarter's mining operations have shown improvement as compared with the preceding period. The tonnage milled increased 4,550 tons, and the yield 1s. 2d. per ton milled, with an increase in total working profit of £8,621. A number of minor falls of ground have taken place underground, but they have not been sufficiently serious to cause a dislocation of normal mining operations.

The latest issue of the directory of "Radio Stations of the World" lists 7,000 ship wireless stations, which require the service of more than 15,000 licensed radio operators. The regular land stations required to handle the business of these marine stations number more than 1,000, with a working force of 3,200 men. In addition, the records show about 2,000 amateur stations in the United States to be licensed, although this is but a small percentage of the total number of amateur stations in the country.

Situation Wanted.

MINING MAN, age 42, M.Inst.M.E., 21 years' South African experience, Rand, Lydenburg District, Natal Coalfields, Surveying, Assaying. Underground Work (many years Mining Contractor) seeks engagement. Small salary, with interest in profits. Experienced in working small properties. Abstainer. Good references.

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Situation Vacant.

WANTED AT ONCE.—A Tip-Top Fitter for Supervising the Shops and Mechanical Repairs on the Dredge. Salary £35 for one month trial; if gives entire satisfaction, £40

Applications, with particulars and testimonials, to Andrada Mines, Limited, Macequece (Portuguese East Africa). Recommendations from firms known to Andrada Mines preferred.

Mine Safety, Sanitation, and Welfare Bulletin.

MISCELLANEOUS MINE ACCIDENTS.—IV.

[By C. E. Hutton, Inspector of Mines, Germiston District.]

Travelling by Ladders.

The records of past years show that very few accidents happened to users of underground ladders; this is a little surprising, as one often comes across ladders that are not always what they might be. It is to be hoped, however, that the accident rate in this connection will not show an increase after this statement.

Overwinding.

The term "overwinding" also covers overwinding in either direction, a runaway skip or cage or bucket, through either carelessness on the engine driver's part or defective material. Last year (1914) there were 14 separate accidents reported, causing 21 deaths and injuring 21 persons. One winding accident at Driefontein accounted for 14 deaths, due to the engine driver losing control of his engine, and in another case a bridle broke, causing the death of four persons, and a third being due to a skip being accidentally lowered into a sump which resulted in the death of one native. Other fatalities were due to small winches, serving winzes or incline planes, getting out of control. The use of detaching hooks is now compulsory in all vertical compartments through which persons are transported, and in cases where safety catches are not in use, spring keeps (or jack catches) must be fixed in the headgear to hold the cage should the wings or bonnet of the detaching apparatus fail to do so after the automatic disconnection of the winding rope. Because of the fact that a large proportion of overwinds were caused by the driver starting in the wrong direction when the cage or skip was at the collar of the shaft, it has been made compulsory that a signal apparatus shall be fitted to all licensed hoists. This signal warning device, invented by Mr. Phillips, of the Knights Deep, is an electrical arrangement which causes a bell or buzzer to sound if the reversing lever be in the position to hoist the cage at the collar, and only works when the cage and the reversing level have these relative positions. This warning arrangement is not necessary if the hoists are fitted with a speed controlling device, such as the "Visor" or "Whitmore" gears. On the whole, we have, I think, to congratulate ourselves that the certificated engine drivers on these fields are an excellent and careful class: the winding records of the Rand prove this.

General.

Before concluding this series of lectures, I would draw your attention to the fact, which is ever apparent on all mining fields, and that is, accidents are inseparable from mining as they are in all other hazardous tasks. This being an established fact, it is obvious that, besides doing all that you possibly can to prevent accidents in the first instance, it would be wise to put yourselves in the position of being able to render first aid to injured persons. Dr. Irvine, in his book, "First Aid in Mining," says:—"Ill-considered assistance may easily do harm; efficient help may sometimes make all the difference between life and death, may frequently considerably reduce the duration of the injured man's incapacitation, and will always tend to lessen shock and the risk of infection, and to minimise suffering." From this quotation you will readily appreciate how helpful it would be to others if you have a knowledge of "First Aid," and become the "friend in need." The complete book of the Mines and Works Regulations is so full of matter that it is difficult for you to wade through to pick out the regulations which directly concern you and your particular work. This fact has been recognised by the "Safety First" Committee, who have, to lessen this perplexity, issued in the form of a small book, extracts and digest of the regulations which refer to the duties of underground workers. This little book can be obtained from the mine office at no cost. In conclusion, I would point out that during the last five years the accident rate has been steadily decreasing, the figures being:—1910, 4·21 per thousand per annum; 1911, 4·10 per thousand per annum; 1912, 3·90 per thousand per annum; 1913, 3·81 per thousand per annum; 1914, 3·22 per thousand per annum. We have all our part to do in the reduction of accidents. We are all responsible persons, and should endeavour to do our work well—given co-operation between the miners and the shift bosses and the shift bosses with the managements, it ought to be possible to prevent many accidents, and so save much suffering. I would like to point out to you, so that no misunderstanding may exist, that the expressions of opinion I have given on various points are my own opinion, and in no way must be construed to be taken as necessarily representing the opinion of the Mines Department. The whole object of these lectures and discussions is to give you an idea how accidents in the past have been brought about, and how they might be prevented. I only hope that we have all learnt something by these meetings that will assist the cause of "Safety First."

New Modder Share Splitting Scheme.

The secretaries write:—"We beg to inform you that the following cable has to-day been despatched to London for publication:—'In view of repeated application from many shareholders, Board of Directors have decided to convene extraordinary meetings of shareholders in January next to consider proposal to subdivide present £4 shares of this company into shares of the nominal value of £1 each. Circular and notice will reach shareholders early in November.'" The fruition of this long-expected scheme will be welcomed by the shareholders of the company everywhere.

An electric railway, with many interesting and novel features, transports people, automobiles, teams and general traffic up the steep side of a mountain at Hamilton, Canada. The "mountain" is really the steep escarpment, behind the city, over which the Niagara River originally flowed. This height of about 400 feet is very steep and is cut by very few paths and roads which are almost too precipitous for service. Consequently an electric railroad has been built to handle the traffic. Two cars are balanced on an incline 800 ft. long with a grade of 40.27 per cent. Each car weighs 30.000 lb. and runs on a 12-ft. $1\frac{1}{2}$-in. gauge track with a carrying capacity of 30,000 lb. The trip requires one and one-half minutes and the car is raised and lowered by cables attached to electrically driven hoist motors.

WRIGHT'S ROPES.

"PRACTICAL MINING ON THE RAND."

This book will help any miner or learner to do better work with hand labour and machines. Price 5/6 post free, from the office of this Journal.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Brighter and More Hopeful Tone for October—Smart Advance in Small Galvanised Fencing Wire—The First Rise Since the War of Motor Spirits and Paraffin—Goods Freely Arriving, Hence an Easier Tendency in Prices.

The better war news on Monday last put a brighter tone into business circles, but as no extra orders came along the talk soon degenerated into what is likely to happen in the immediate future. However, the concensus of opinion is that still better news will come along and we shall all be rewarded for our patience. On Wednesday morning a little activity was experienced on the Commercial Exchange in bookings for October month on account of the mines, but outside business continues very slow indeed, as the Municipalities and Railways, as well as other Government institutions, are giving out exceedingly few orders. Stocks are generally good and shortages are now the exception and not the rule. Railway material is not too plentiful, and certain sizes in hammer handles are not available at the moment. Three months ago the special war feature was the buying "to arrive" on the basis of invoices for goods coming forward, but now there is hardly any business transacted on those lines, as goods are coming forward so plentifully and freely, especially considering the war times. The feature of the week has been the rise of 1s. per case in motor spirits and 6d. for paraffin. This is the first time since the war that a definite advance has taken place in these goods. The fact is that they came direct from America, and before the war very keen competition existed and there was a superabundance of stocks here, otherwise an advance would have occurred when the Government bought such quantities of motor spirits for their military expeditions. The reason for this slight increase in price is owing to the exchange being so high between America and here, via London, which may soon be obviated now that the credit loan is practically fixed up in America, on behalf of the Allies. A commercial broker states that there is much complaining amongst merchants that business is poor as regards the aggregate turnover; however a decidedly hopeful feeling is uppermost for the October month.

Iron, Steel and Wire.

Galvanised wire is scarce and dearer, particularly anything over No. 8 gauge. A certain line which could be had at 17s. about a fortnight ago is now 25s. 6d., with very limited quantities at that. An incident recently happened where a customer from Rhodesia came into a store and asked the price of a stack of an extra thin wire. The trader, thinking to put him off buying, asked about three times the pre-war rate, when the man from Rhodesia immediately answered that he would take the lot, rather to the chagrin of the Johannesburg man. Samples of American barbed wire were shown in town during the week, and a good trade is expected, as it is difficult to get it from Britain, as the Government there has the first call and is using enormous quantities. There is no alteration in the price of iron and steel. The price of corrugated galvanised iron is a farthing per foot lower, as quantities have arrived and the demand has slackened, so much so, that in pressing sales for cash, a fraction under 7½d. per foot has been accepted for 24 gauge for a brand which is pushing its way into our market. The galvanised iron market may be expected to be somewhat erratic as that arriving now was bought at the highest rate, whereas consignments now due to leave England were purchased at lower values. Holders anticipating this, are inclined to meet buyers, to avoid the loss of the present decent prices.

Electrical Goods.

Some 150 gross of pure rubber flex arrived here from Britain during the week, which relieved the acute shortage, therefore the nominal charge of 1s. per yard dropped very quickly to the more reasonable one of sixpence. Porcelain cleats are unobtainable in quantities, therefore in the more urgent contracts, split bobbins are substituted so that the work should not be delayed. Business is not at all bad in sales, but contract work is not too plentiful as people put off things, as an idea prevails that materials will be cheaper as they are becoming more plentiful, through shipments arriving fairly regularly. In addition to round blocks being made locally, square switch blocks, 6 in. x 3 in., can be added to the list, at 8s. per dozen. It appears that this industry was started, in a back room of the house occupied by a carpenter who wanted a job at the time, and it incidentally came to his knowledge that switch blocks were wanted, when he tried his 'prentice hand, which eventually resulted in a nice little business being established.

Timber and Building Material.

The timber trade is quite steady and prices remain much the same. One firm gives the quotation at 9½d. for deals 9 in. x 3 in. over 16 feet in length, which is an eighth decrease, perhaps more apparent than real, but, however, just sufficient to illustrate that the tendency is rather easier than otherwise. The demand in Johannesburg is fair from the smaller contractors, who are erecting private dwellings for the owners, which is encouraged by the many building societies in Johannesburg, all of whom seem to have a superabundance of funds to lend to the right class of borrowers, but so far the speculative builders are not much encouraged. In addition to this local demand, the country districts in the Transvaal are purchasing more freely, also for private dwellings chiefly.

Second-hand Materials.

The yards are accumulating timber, roofing iron, as well as quantities of mining materials and machinery parts. In addition to this more supplies are expected to come in from a coal proposition, and several disused shafts of some of the earlier gold mines. There is a fair demand for large piping, chiefly for irrigation services, also the mines are in want of the smaller kind, from ¾ in. up to 2 in. for spraying purposes down the mines. All piping is more or less scarce, therefore decent second-hand often realises within a fraction of the quotation for new.

Plumbing and Tinsmiths.

Recently there has been quite a run on galvanised flat iron for the purpose of roofing work, guttering and household sanitary uses. Several of the shops, with up-to-date machinery, are supplying tanks and chimney piping and bends to Delagoa Bay, also to the Pilgrims Rest district. At one time we sent tanks and tinsmiths' work to the Belgian Congo, but since the expedition to the South-West and now to German East Africa, the orders from Elisabethville have ceased. In addition to the demand made on Johannesburg for household and mining utensils, a lot of work is continually in hand for cattle troughs and farming requirements, not only for the Transvaal, but Rhodesia, Orange Free State, and the northern Cape. Altogether the plumbing trade in Johannesburg is now quite good as the local demand is excellent for water tanks for the ever increasing number of private houses in the suburbs, whose occupants as a rule take such a delight in gardening.

TO LET ON TRIBUTE.

The Andrada Mines, Limited, intend to let out on Tribute the BRAGANZA MINE, situated in Mozambique Territory, near Macequece. The Company is now working the 3rd level, 400 feet, and developing the 4th level, 520 feet. The output of the Mine since the start has been £61,310, while during 1913, 1914 and the first six months of 1915 £47.000. Conditions of the Tribute can be obtained from the Andrada Mines, Macequece (Portuguese East Africa), on application.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; mild steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in., 6d. per lb.; ½ in. up to 2 in., 37s. 6d.; 6 in., 35s.; over 6 in., 32s. 6d.; ⅝ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 30s.; over, 29s.; ⅞ in. and 1 in., 29s., all per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 40s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7½d. to 7¾d., 11 ft. 8¼d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6d., 9 ft. 6¼d., 10 ft. 6½d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 30s. to 35s. per 100 lbs.; solder, 50 per cent., 1s. 3d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9½d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.

Bricks, cement, lime, etc.: Cement, nominal, 32s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 20s. 6d. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 42s. 6d. 2/5 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 22s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 11s. 11d. 2/5; petrol, 22s. 2/5; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 4s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; radiator lamps, 4s. 6d. each; double pure rubber flex, 6d. per yd.; 3/20 coils of wire, 27s. 6d., do., 3/22, 23s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

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Engineering Notes and News.

THE TREND OF ELECTRICAL DEVELOPMENT.

An interesting presidential address was recently delivered before the American Institute of Electrical Engineers, by Mr. Paul M. Lincoln, on the occasion of the recent Deer Park Convention. He reviews the present position of electrical plant as regards efficiency, and discusses the possible directions of future progress; the following is a summary of his remarks:—

In the matter of efficiency, it has always been recognised that electrical apparatus is in a class by itself. Mechanical energy can be converted into electrical by a generator, or *vice versâ*, by a motor at an efficiency ranging up to as high as 97 per cent., or even more in the most favourable cases; it is safe to say that the average efficiency of conversion of mechanical energy into electrical by generators or electrical energy into mechanical by motors, including all sizes under actual operating conditions, will reach 90 per cent. Owing to the fact that the size of the average electrical generator is much greater than that of the average motor, and that it is possible to operate the generator at higher average loads than in the case of the motor, it must be apparent that the average efficiency for converting mechanical energy into electrical is higher than the reconversion of this electrical energy back into mechanical. The average generator efficiency is undoubtedly well above 90 per cent., while it is doubtful if the average motor reaches so high a figure. Our ability to convert mechanical energy into electrical, or *vice versâ*, has reached so high a value, that even if we could obtain perfection itself, we could add only a matter of 10 per cent. to what we have already accomplished. The efficiencies of some of our larger transformers, for instance, exceed 99 per cent. The rotary converter, in which alternating current is changed into direct, attains efficiencies approaching 98 per cent. It is evident that perfection itself could not add greatly to existing performances, and hence nothing revolutionary may be expected along this line in the future. When we come to consider the prime mover, we find a marvellous improvement in recent years. Taking first the water-wheel; the early attempts to develop power at Niagara Falls constitute a significant commentary upon the status of the water-wheel at that time (the late 60's and the early 70's). Of 215-ft. head these earliest wheels used only some 15 or 20 ft. for some of the least progressive, and from there up to possibly 40 or 50 ft. for the more progressive. To-day, water-wheels have no limit in head except that imposed by the strength of available materials, and efficiencies ranging up to 90 per cent. are expected as matters of course. Improvements in water-wheel design will, of course, continue, but perfection itself would add but a matter of 10 per cent. to the best of our modern practice, and not exceed 20 to 25 per cent. addition to the worst. No startling or record-breaking developments need be expected along these lines so long as the law of conversion of energy holds good. In thermo-dynamic engines, too, the last few years have seen some marvellous improvements; the turbine has enabled us to attain efficiencies in thermo-dynamic conversion that were out of the question with the reciprocating engine of Watt. In the thermo-dynamic conversion the law of conservation of energy takes a peculiar form. If the heat contained in the coal is used to heat a fluid used in a thermo-dynamic engine, the maximum mechanical energy that can be taken from that engine can bear no greater a ratio to the total heat imparted by the fuel to the fluid, than the actual range of temperature used in the engine does to the maximum absolute temperature of the fluid as it enters the engine. Some of the best of our modern steam turbines have attained to as high as 75 per cent.—or possibly a little more—of this "Rankine cycle efficiency." In these most perfect engines, therefore, perfection itself would not add more than 25 per cent. or such a matter. It is only with prime movers of the largest size and most modern design and construction that so close an approach to the ideal can be attained. As capacity is reduced it becomes rapidly more and more difficult to attain the higher degrees of economy in thermo-dynamic machines. This must always remain one of the potent factors in the economics of power supply; it is, and undoubtedly always will be, one of the fundamental reasons why central station supply of electric service must prevail as against isolated plant supply for the same service. The central station can, of course, use units which are very large in comparison, and can be worked at much higher average loads than must necessarily be the case with an isolated plant. One means that has been suggested to improve the efficiency of the thermo-dynamic engine, is to increase the temperature range through which the working fluid is used. The only two ways to extend this temperature range when using steam are to increase the super-heat or increase the pressure. Increasing the super-heat over the best modern practice does not promise results commensurate with the expenditure of heat to obtain this super-heat, since increasing the temperature at one end of the heat cycle simply involves a loss in the efficiency at the other end. There is a rather definite limit to superheating of steam, beyond which it is useless to go. Increasing the steam pressure does promise results, and it is probable that the tendencies for the future will be towards these higher steam pressures. Another promising method of increasing temperature range is that, to which attention has been called during the last year or two by Mr. W. L. R. Emmet, of Schenectady, of using mercury as the working fluid in a heat engine for temperature ranges above

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1915.

BY S. R. POTTER.

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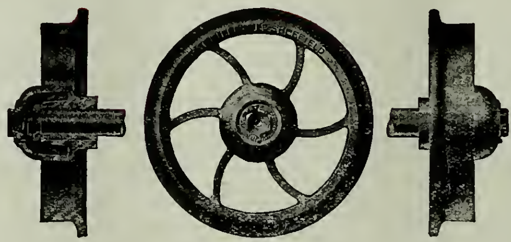

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those available with steam. After working the mercury through a given temperature range, the heat remaining in the mercury is transferred to water, and the steam thus made available is again worked through a lower temperature range. The advantages of this are that the steam cycle is in practically all respects the same as in standard steam turbine practice, and the mercury cycle is closely similar to the steam. Additional energy is made available from the same amount of initial heat due to the greater temperature range obtainable by the use of the mercury. The main disadvantage is the poisonous nature of mercury vapour and the difficulty of absolutely preventing its leakage at the high pressures and temperatures of the mercury boiler. These practical difficulties make it too early to predict whether or not this method will work out as a feasible solution of the thermo-dynamic engine problem. However, it can be said that, without some such method or device, the future is unlikely to bring any revolutionary improvements in thermodynamic engines over the best of modern practice. In the matter of size and capacity of generating units it can safely be said that this will hereafter be fixed by the conditions to be met and not by any inherent limitation in our ability to produce units of any desired outputs. We now have units of 30,000-kw. capacity in service and still larger ones projected, and no limitations of design or material appear of such a nature as to place a stop to further progress along the same line. In June, 1898, Mr. A. E. Kennelly gave an inaugural address, in which he pointed out that " in 1884 a 50-kw. dynamo was considered a large machine, while a 100-kw. Edison steam dynamo was justly called a ' jumbo.' At present the largest size generator built or building is of 1,600-kw. capacity." In the 14 years from 1884 to 1898 the maximum size of generator, therefore, increased 46-fold, while in the 17 years since that time, the increase has only been about seven-fold. While the increase in capacity, therefore, has been a marked one, the rate of increase has not been so rapid during the last 17 years as it was in the previous 14 years, a result which naturally might have been anticipated. The future will undoubtedly continue to produce larger and larger capacity machines, the limit as to size being dictated by plant capacity and economic considerations and not by any inability to produce the larger sizes. In the matter of selling price, Kennelly mentioned that "the price of dynamos in 1882 was about 20 cents per watt of output, while dynamos of similar running speed for comparatively small sizes without switchboards now cost about 2 cents per watt." The speed and size of these units is not mentioned, but it may be said in comparison that, nowadays, prices are frequently quoted below ½ cent per watt. In this respect again the improvement in the last 17 years has not been so marked as it was in the 14 years previous; we are approaching a saturation point in this respect. The two fundamental costs of electrical apparatus are those of labour and material. Economies in the use of labour will undoubtedly take place by the introduction of new methods of scientific management, etc., but these need not be expected to be revolutionary in character so far as cost of apparatus is concerned. The tendency of the labour item will unquestionably be toward appreciation rather than depreciation. In regard to the item of material, modern design has approached very close to the physical limits of available materials. With higher permeability, making available greater flux densities, the cost of electrical apparatus might be considerably reduced; but it is highly improbable that improvement will be of such a revolutionary character as to cause any sweeping change in the cost of electrical apparatus. The hysteresis and eddy current losses that take place in irons and steels that are subjected to varying magnetic fluxes is another of the limits encountered in the design of electrical machines. Our modern transformer steels in the matters of losses and iron ageing qualities show a vast improvement over those formerly available. Unfortunately these improvements have so far been accompanied by a decrease in permeability which is highly objectionable in rotating machinery. Unquestionably, further improvements will be made, but will probably make no revolutionary change in the costs of electrical apparatus. The conductivity of the copper of commerce is within an extremely small percentage of that of pure copper, and we cannot expect to obtain a higher conductivity in copper than that of purity. There remains, of course, the possibility of using some metal other than copper, but there is apparently no metal that even approaches the space and cost characteristic of copper that makes it so essential to the construction of electrical apparatus. Aluminium is a competitor only when the volume of the conductor is not an essential element in design, as in transmission lines and the like.

To be continued.)

New Patents.

179. Frank Oliver Willcox.—An improved method of packing mine timbers and the like.
180. John George Robinson.—Improved apparatus for use on locomotives and like engines fitted with steam superheaters.
181. Arthur Churchill Fisher.—A resilient wire-spoke for bicycle, motor cycle, motor car, motor bus, or motor wagon wheel.
182. Arthur Courthope Gull, Charles Watson and Sydney Bingham.—Improvements in girths and saddles.
183. Isaac Heyman and Charles Snaier.—Improvements in boots, shoes and other similar coverings for the feet.
184. Botha Helmuth Lindhorst.—Improvements in means for actuating shaking chute conveyors.
185. Benjamin Augwin.—Improvements in the utilization of compressed air for motive power purposes.
186. Harry Dalton Rankin.—Improvements in method of recovering values from metalliferous material.
187. Friedrich Godfried Carl Rincker.—Improvements in melting of iron, steel and other substances not easily reduced to the molten condition.
188. James Peter Cloete.—Improvements in percussion hand drills and the like
189. Charles John Tutt and Evelyn Herbert Christopherson.—Improvements in and in connection with respirators and similar appliances.
190. Andrew Frederick Crosse and Frank Campbell Dumat.—An improved process for the treatment of crushed auriferous ore products.
191. James Samuel Thomas Beveridge.—An invention for an improved foresight for firearms.
192. Thomas Harrison.—Self-oiling roller for haulages.
193. George Hamilton Allen.—Improved generator for gas producer plants.
194. Robert Alfred Lehfeldt.—An improved process for the recovery of zinc from solution.
195. John Athelstan Parsons.—Improvements in cupolas and other shaft furnaces.
196. Didrik Welge.—Improvements in liquid rheostate.
197. Max (Nordikha) Simon.—Improved method and means for making springs for mattresses, settees, chairs and the like.
198. Alexander Purser.—An improved device for bending pipes and the like.
199. John Penhale.—Improvements in alcoholic fuels for internal combustion engines.
200. John Lloyd Forsyth and William Robinson Bailey.—Improvements in switches or like devices for electrical mine-signalling apparatus.
201. Sidney David Lane.—Improvements in or relating to corrugated or like packing material.
202. Alexander Purser and George Daniel Hook.—An improved automatic valve.
203. Charles Sirch.—Improvements in weighing scale.

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The Week's Meetings.

SIMMER AND JACK.

The annual meeting of the Simmer and Jack Proprietary Mines, Ltd., was held on September 24 in the board-room of Consolidated Gold Fields Buildings, Mr. D. Christopherson presiding. The Chairman, in moving the adoption of the report and accounts, said:—On the credit side of the balance sheet contained in the report and accounts now before you, you will notice that the property account is now subdivided to show under different headings the interests held in townships and buildings in townships as distinct from freehold ownership other than townships. Our auditors have advised us that this is a clearer and possibly more accurate method of stating the account. The value of stores on hand at the end of the year has increased by £8,500, due to larger stocks being held. In spite of war conditions the position of this company in common with other mining companies on these fields in regard to the supply of the principal commodities required for mining and reduction operations remain satisfactory. Investments show at a reduced figure, principally due to the fact of our having written down our holding in Simmer Deep to a value more closely approximating the market price of that company's shares. We have received two further dividends on our holdings of preference shares in the Victoria Falls and Transvaal Power Company and two dividends on the Breyten Colliery shares. The dividends on the latter shares have been credited to investment account in reduction of the book value of the shares. Turning to the other side of the balance sheet capital remains unchanged; while the reserve account has been decreased by the amount written off the book value of Simmer Deep shares. This reserve account, it will be remembered, was created largely out of premiums on shares issued. The renewals fund stands at £67,700, and of this amount £45,000 still remains invested in Victoria Falls 6 per cent. preference shares. The value of gold in reserve has increased by some £33,000. The balance on appropriation account shows at £78,876.

Mining Expenses.

In the working expenditure and revenue account, mining expenses as compared with last year show an increase of some £45,000, as against which there was an increase of 38,700 tons milled, whilst development costs have been increased by some £11,000. Both these increases have been anticipated and referred to in previous reports as likely to happen, owing to the fact that, as the proportion of reclamation tonnage milled is gradually reduced, an increased tonnage has to be obtained from the lower levels of the mine, which means more expensive mining; further, more development work was done (thus providing a larger number of faces available for stoping) in order to replace reclamation ground being worked out on the upper levels. General mine expenses, reduction expenses, expenditure on renewals and head office, and London and Paris offices' expenses show on balance about the same as last year. Under the heading of profits tax there is a marked increase, due principally to our having provided a sum of £1,000 for the special war levy in terms of the Mining Taxation Amendment Act of 1915, by which a special tax of £500,000 was imposed on the gold mines in the same proportion as the profit made by each company bears to the whole amount of the profits of gold mining companies assessable under the Mining Taxation Act. Income tax, which is a new tax (chargeable in the case of gold mining companies only on the revenues of the company outside mining) accounts for a further expenditure of £1,547, and expenditure which can be assessed due to the war amounts to £4,316, approximately the same amount as the strike expenditure appearing in last year's account. On the credit side, gold account, including gold from accumulated slimes, shows an increase of £70,000 and revenue from sundry outside sources a decrease of some £8,000. The net result was that £296,379 was carried to appropriation account as against £317,445 the previous year, leaving that account with a credit balance of £78,876 after having deducted dividends Nos. 25 and 26 of 5 per cent. each declared at the end of December and June last and the appropriations to the credit of the reserve for additions and renewals.

Increased Working Profit.

In summing up the results for last year, there are one or two points which should receive your special consideration. First, the actual working profit (i.e., leaving out sundry revenue on the one side and contributions to Miners' Phthisis Compensation Fund, Profits Tax, Income Tax, etc., on the other), showed an increase of about £12,000. But, in addition to this, there is an increase of £33,000 in the gold reserve, which is added to in months when a surplus amount of gold has been produced, either on account of the grade of ore milled having been abnormally high, or for any other sufficient reason, and which is used to assist monthly profits in case of an accident, or on account of a temporary fall in grade. Secondly, sundry revenue was reduced by £8,000 due mostly to the fact that in order to strengthen the reserve of water in the Simmer Pan the company almost entirely stopped supplying water from this source, and so reduced the revenue from sales of water by some £5,000. The result of this policy is that to-day, at the end of the dry season, the Pan is full up. Thirdly, the special war levy for which a provision of £16,000 has been made in the accounts, and, lastly, the increase in the cost of stores used in mining operations and the absence of many efficient employes who have gone on active service, which has necessitated taking on less efficient temporary hands. The recovery value of the ore which, on the declared output, showed an increase of over 9d. per ton, was partly due to a general improvement in value of ore met with in stoping towards the latter part of 1914. The ore reserve, according to the superintending engineer's report, shows a slight decrease in tonnage and value as compared with the figures for the year ended 30th June, 1914. There is not much further necessary development to be done, as large areas not included in the ore reserve can be attacked from existing development. Under these circumstances the figure representing the tonnage of the ore reserve will in time be gradually reduced.

Sand-filling Successful.

Sand filling, as you will gather from the manager's report, has been entirely successful on this mine. All current sand residues are now lowered into the mine. The surface costs, during August, 1915, were 3.256d. per ton of sands dealt with, as against a cost of 3.535d. per ton deposited during 1910, when all sands were deposited on the dump. In addition to the surface costs, the average cost of lowering and underground disposal of the sands during the past financial year amounted to 4.996d. per ton filled. This cost is equivalent to 1.683d. per ton crushed which, with the surface costs (which are equivalent to 1.825d. per ton crushed) make a total cost per ton crushed of about 3½d. When considering this figure it must be remembered that sand filling, apart from its other benefits, relieves us of expenditure, which would otherwise be necessary, on timbering and other forms of support for mine workings, and also enables pillars to be removed which otherwise would have to be left standing.

White and Native Labour.

The manager, in his report, refers to the unsatisfactory supply of white labour, especially underground. This has probably been accentuated owing to many efficient men having gone on active service. As you will see, the company has been endeavouring to make the conditions of life on the mine more attractive by re-conditioning certain blocks of single rooms throughout, and adding conveniently-arranged bathrooms, and so forth. As regards underground men, I hope shortly that improved leave regulations will be brought into being whereby these employes will be put in a position to take an annual holiday. At the last annual meeting I referred to the probability of an increase taking place in the supply of native labour for the mines of these fields. Many of the natives discharged from service when the diamond mines closed down waited for some time at their homes, in the hope that they would reopen. and it is therefore, only within the last few months that we have begun to feel the full effects of the influx of natives from this source. The continued inactivity of the diamond fields, coupled with an indifferent crop season in the native territories, have together brought about a greatly improved position. In the case of this company the number of natives in the company's employ at the end of the last financial year was 3,840, as compared with 2,463 at June 30, 1914. At August 31, 1915, the figure was 4,414. The average number employed during the past financial year was 3,285, as compared with 2,743 for the previous financial year. Many of these natives are, of course, raw and inexperienced, and, in addition, the general efficiency of the native force has been impaired to a considerable extent by the many changes in the white supervision to which I referred above, which have taken place during the year. Consequently, although the supply, so far as this mine is concerned, is almost adequate, we are not yet getting the full benefit on the improved conditions. A recent reorganisation has been made of the basis upon which native labour complements are assessed for the various mining companies, and it is confidently hoped that a fairer apportionment of the available supply will result therefrom.

Co-operation of Staff.

In conclusion, I would like to voice, on behalf of the board and the shareholders, our appreciation of the services of Mr. O. P. Powell, the manager, and his staff. Many of the most efficient employes, both underground and on the surface, have been and are on active service, and, as stated before, many inexperienced men have had to be taken on. Owing to the spirit of co-operation that the manager successfully obtained from his staff and employes, many difficulties were overcome—difficulties which otherwise would have been reflected on the output of gold and still more so on the profits made. These difficulties were not only to be found underground, but also on the surface, and included solving problems of economy and at times of devising substitutes for stores and commodities essential to operations which, owing to war, have enormously increased in price; and in this respect we have also to acknowledge the services rendered by Mr. C. D. Leslie and his staff.

The report and accounts were adopted.

The election of Mr. W. S. Smits as a director in place of Mr. Hume, resigned, and Mr. D. W. Rossiter in that of Mr. F. D. P. Chaplin, and the further election of Mr. C. Hely-Hutchinson in place of Mr. Rossiter, on that gentleman resigning, were confirmed.

Messrs. D. Christopherson and F. Leslie Brown were reappointed directors.

The auditors, Messrs. Douglas, Low and Co. and Mr. T. A. White, were re-elected.

CORONATION SYNDICATE.

Treatment of Machavie Ore.

Presiding at the annual meeting of the Coronation Syndicate in Barsdorff's Buildings on September 24, Mr. H. A. Rogers said: The audited balance sheet and profit and loss account and directors' report now before you give you all the information in regard to the position of affairs of your syndicate at 30th June. Your board has, since the date of the last annual general meeting disposed of a portion of its freehold ground in the district of Heidelberg, and is now only the holder of some 277 morgen. As soon as a satisfactory price can be obtained for this area it is the intention of your board to also dispose of the same. You will see from the directors' report that no alteration has taken place in your shareholdings in the Afrikander Proprietary Mines, Ltd., and the Machavie Gold Mining Company, Limited. No work has been carried out on the Afrikander Proprietary Mines, Ltd., during the period under review, the property being in charge of a caretaker. Crushing operations have, however, been conducted on the property of the Machavie Gold Mining Company, Ltd., during the past year, and, although innumerable difficulties have been met with, small profits are being made. The board of directors of the Machavie Gold Mining Company, Ltd., are still investigating the treatment of the company's ore, which, as you are no doubt aware, has not lent itself to the usual methods adopted on the Rand. So far no satisfactory solution has been arrived at. Experiments have lately been conducted by roasting the ore, and then treating the same in the ordinary way by cyanide, and from reports received it seems as if this method will solve the treatment difficulty. There is very little for me to add in regard to the figures as appearing in the balance sheet and statement of profit and loss. The expenditure has been considerably reduced during the past year.

Messrs. Carl Hanau, H. A. Rogers, J. B. S. Delmore, and R. M. Connolly were re-elected to the directorate, and Mr. Gustav Sonn was elected to take the place of Mr. D. Wightmann.

Messrs. Alex. Aiken and Carter and Douglas, Low and Co., were reappointed auditors.

SUB-NIGEL.

Past Year and the Future.

Addressing the annual meeting of the Sub-Nigel, Ltd., on September 24, Mr. D. Christopherson said: On the credit side of the balance sheet you will notice that property account has been increased by £129 18s. 10d., due to legal and survey charges on claims, etc., purchased during 1914. Shaft sinking has been increased by some £4,000, whilst development now stands at £18,733. This latter account takes the place of exploratory development as shown in last year's balance sheet, amounting to £14,109, together with a further £4,624 expended during the year on exploratory development. The item "capital expenditure on uncomplete estimates at date"—£28,070—represents expenditure up to the close of the financial year on estimates authorised in connection with the extension of the plant which has not been transferred to the main plant headings by reason of the estimates concerned not having been completed at the 30th of June, 1915.

Unfavourable Comparison.

The results for the year under review compare unfavourably with those obtained in 1914, due to several causes. Though the tonnage crushed was only slightly increased, the total working expenditure for 1915 (including expenditure on renewals and replacement of machinery, plant, etc, amounted to £108,286, as against in 1914 £89,023, an increase of some £19,000. The large items which went to make up this difference were, first, an increase of £6,000 in the expenditure on renewals of plant, due to replacement of certain portions of the plant necessary when the capacity of the reduction plant was increased, and which expenditure could not be charged to capital. Secondly, £14,500 was charged to working costs on account of development as against £9,100 in 1914, or an increase of £5,400. Mining costs were increased by nearly £5,000. The items under the heading of "mining" showing the largest increase are tramming and shovelling with an increase of 7.643d. per ton crushed, and pumping 5.847d. The former increase is due partly to the cost of new installations to facilitate the handling of stope ore, and also to the fact that the working places were less accessible. This latter position will remain more or less the same until certain connections underground have been made. Pumping costs were incrased as it was found necessary to enlarge sump capacity at several points in order to allow water to collect therein during the day which could be pumped at night, thus sparing boiler power.

Costs and Recovery.

General mine expenses were up nearly £1,000, due to the extra licences on the additional 119 claims purchased during the latter portion of 1914, to leave pay which showed an increase due to leave having been given to your manager when ill-health compelled him to resign, and to increased payments for phthisis insurance under the Miners' Phthisis Act. It will thus be seen that a substantial portion of the increased costs incurred for the year were in preparation for and incidental to the bringing into operation of the increased milling capacity. The total working costs per ton milled amounted to 37s. 0.479d., as against a recovery grade of 39s. 10.934d. The net results were a profit of £11,792, that is, after taking into account on the one side sundry revenue and on the other side charges on account of Miners' Phthisis Compensation Fund, South African Income Tax (which is levied on gold mines on revenue obtained outside of revenue obtained from actual mining operations), and expenditure due to war. The above explains why the dividend for the half-year ended 30th June had to be passed.

Ore Reserves.

The fully developed ore reserves are estimated at 194,000 mine tons, valued at 7.8 dwts., and the partially developed ore at 26,000 mine tons, which, from available information, indicates a value of 9.5 dwts. It should be noted that the value of the ore reserves are given in mine tons. If the value was given on the basis of a milling value (i.e., after allowing for sorting) the value would probably be about 2 dwts. better.

Prospects for the Year

As regards the prospects for the current year, since the close of the financial year the tonnage crushed has increased month by month. For the month of June (the last month of the financial year) the tonnage crushed was 5,950, for July 6,570, and for August, 6,930, and I am glad to say (as you will have noticed from published figures) profits have correspondingly increased. Working costs for the last two months were respectively 32s. 10.6d. and 32s. 0.909d. per ton crushed, as against an average of 34s. 10.5d. (excluding expenditure on renewals) for the year ended June, 1915. Certain alterations and additions are being made in "E" shaft in order to enable a somewhat larger proportion of the tonnage crushed to come from that area. This will be of assistance towards more efficient working. As you will see from the superintending engineer's report, when the workings of "B" and "D" sections have been connected up with "C" incline shaft, cheaper working facilities will be obtained, and when we are able to install a pumping plant on the 15th level of this shaft, where it is proposed to concentrate the underground water, these facilities should be further extended.

The development in "E" shaft has opened up a fairly large area of high grade ore, but until it is possible to locate and open up the reef on the western side of the dyke in this shaft, it is impossible to form any idea of the value of the large unexploited western area of your property. Work by means of boring is now proceeding in order to obtain some information on this point. In "B" shaft section development is being extended eastwards where there is some prospect of adding to the ore reserve. The position of the mine generally is such that there is every reason to think that the results for the current year should show a marked improvement as compared with the past year. The new plant is working satisfactorily, and credit is due to the manager and his staff that the change over went as smoothly as it did. The price of stores and other commodities necessary to our operations have, on account of the war, greatly increased, but every endeavour is being made to economise where possible, whilst the efficiency generally is suffering owing to a large number of experienced men being now on active service. I regret, as referred to before, that your late manager, Mr. Parry, had to resign on account of ill-health, and his place was filled by Mr. Dunning, who has been in the service of the Gold Fields group of mines for many years.

Mr. C. Hely-Hutchinson's election to the directorate in place of Mr. D. W. Rossiter, who resigned, was confirmed. Mr. Rossiter took Mr. F. D. P. Chaplin's place.

Messrs. W. S. Smits and P. Dreyfus were re-elected directors.

Messrs. Douglas, Low and Co. and Roberts, Hays and Co. were re-appointed auditors.

There were represented at the meeting personally and by proxy 248.369 shares out of an issued capital of 431,580 shares.

McCREEDY TINS, LTD.

Annual Meeting.

At the annual meeting of McCreedy Tins, Ltd., held in the offices of the company, Bettelheim Buildings, on September 24, Mr. Harry Graumann, who presided, said: The balance sheet, expenditure and revenue account and directors' report for the year ended the 30th of June are now before you for your consideration and approval. In moving their adoption I will briefly refer to the main points of the report and accounts. You will note that the capital of your company and the extent of your property remain unchanged since the date of the last annual meeting; the former, being £25,400, and the latter, consisting of mineral concession No. 30 and portion of mineral concession No. 45, the area of the whole extending to over 4,584 morgen. Included in this area your company holds the land rights over 982 morgen 516 square roods. Taking the financial position first, you will observe from the accounts that the total revenue for the period under review derived from tin concentrates recovered amounted to £4,614 5s. 7d., while the working costs stand at £4,401 14s. 6d., leaving a net working profit for the year of £212 11s. 1d. This is a very narrow margin of profit, and suffers considerably in comparison with the results of previous years; but the decreased profit is chiefly accounted for owing to the continued fall in the price of tin, and also by difficulties experienced in the hard nature of the ground worked, and troubles arising from the water race. The period intervening since last I had the pleasure of meeting you has been a very serious one, and the absence of any abatement in the gigantic struggle between the Central Powers of Europe and Great Britain and her Allies not only prevents ordinary difficulties being overcome, but increases them in the matter of the export and disposal of our product as well as the expenses in the realisation of the same.

Although the extent of your property is unchanged, you will observe that Property Account is increased by the sum of £77 18s. 1d. This is represented by the acquisition of 161 odd morgen purchased for £80 10s. 10d., less £2 12s. 9d. refund on adjustment of survey and expropriation costs in connection with mineral concessions. Your Board has again considered it advisable to depreciate all machinery and plant, buildings and stores, and an amount of £155 8s. 8d. has been written off. Regarding the operations for the year, 111,600 cubic yards of ground were broken and treated, yielding 57 tons 2cwt. of tin concentrates, of which 37 tons 12cwt. were shipped of an average value of 63.66 per cent. metallic tin. Under ordinary circumstances, and if free from the difficulties I have already briefly touched on, a considerably larger quantity of ground would have been handled, with a corresponding increase on the year's output. And, in addition, to water race troubles, heavy rains in the early part of the year hampered operations, in some instances making it necessary to break through barren ground in order to save concentrates which had got very low down in the races and which otherwise would have been at the mercy of the floods. The pipe lines have now been laid on to "A" Creek, where work has started, and where it is anticipated better results will be obtained. It is expected that the farming operations referred to in the directors' report will in future yield better results. The outlay in commencing operations of this nature is always heavy, and the benefits of breaking new ground are not obtained till the second or third season. The past year's work resulted in a yield of 450 bags of mealies, which will be sufficient to supply all the natives engaged on your property with meal for one year, this will save an expenditure of about £40 per month hitherto paid for mealie meal, and next year it is anticipated, given a fair season, that the mealie crop, beyond providing for the requirements of the natives, will probably leave a considerable quantity which will be available for sale.

The report and accounts were adopted.

The appointment of Mr. L. K. Jacobs as a director of the company was confirmed, and Messrs. J. Andrew Cohen and H. J. Miller were re-appointed to the Board.

Messrs. F. W. Diamond and English were re-elected auditors.

CORONATION COLLIERIES.

Effects of New Competition.

At the sixth annual meeting of shareholders of the Coronation Collieries, Ltd., at the National Bank boardroom, Johannesburg, on Sept. 29, Mr. A. Aiken presided, and there were present Messrs. B. Price, C. B. Wiley, J. F. Rutherford, P. Richardson, C. E. Peirson, W. P. Grimmer, T. G. Otley and A. L. Tregoning, representing 60,836 shares out of an issued capital of 83,000. Mr. A. Aiken moved the adoption of the annual reports and accounts for the year ended June 30, showing a profit for the year of £24,475 19s. 9d.

In doing so, Mr. Aiken said the important fact to the shareholders was that they had found themselves able to declare dividends for the year amounting to 20 per cent., and to add quite a useful amount to the sum carried forward after allowing for the investment of £23,507 in the acquisition of the Tavistock undertaking. "To this result," said Mr. Aiken, "the Tavistock Company has materially assisted which is all the more important seeing that in the course of a very few years now the old Coronation ground on which our mine is situated will be exhausted, and we shall have to rely solely upon the working of the area which is contiguous to the Tavistock property. That area, however, has been satisfactorily proved, and we have every reason to expect a considerable life and coal of similar quality to that of the old pit. Two matters in connection with the working of the colliery last year I think it right to call your attention to—the one is that the average price obtained for onr coal has been 1 per cent. less than the previous financial year; the other is that our working costs rose last year 5 per cent. over the figures of the previous year. The rise in costs is largely the result of the war, which has made all industrial work more difficult, more expensive, and less regular. The war has directly increased our costs of production by the increased prices we have had to pay for the stores and supplies we consume; while an increase also of a material amount has to be recorded in native wages. The profits and income taxes levied on the company show a marked advance; but the country has passed through a period of internal rebellion and war, through the expedition to German South-West Africa, and therefore additional calls from the State were inevitable. The fall in the price secured for our coal has been a noteworthy feature for several years. It is disquieting to find that in the face of rising costs the price continues to drop. The cause is to be found in the fact that new competition which is always arising succeeds in doing injury to the Coal Owners' Association rather than in doing itself any real good. The business of the associated collieries has been well maintained in spite of the difficulties of the year. The only direction in which a serious fall in business has occurred is the export trade through Delagoa Bay, and that is directly due to the war. Freights have risen enormously, and tonnage has become exceedingly scarce and almost impossible to obtain, so that we have every reason to congratulate the associated collieries on being able even in an irregular and ccasional fashion to keep the export trade alive. But at the same time the shrinkage in this matter has affected our returns and profits.

As you are all aware the shares of the Tavistock Company are held by this company, so that the accounts of the former may be considered a portion of this company's accounts. The two sets of accounts you will observe do not altogether correspondent in regard to the dividends received from the Tavistock Company. The first dividend only came into the Coronation account during the financial year under discussion, but was included in the accounts submitted a year ago for the Tavistock Company, so that, while the Tavistock only shows two dividends paid this year, the Coronation accounts show that they have received all three dividends. In future as the dividends are declared by the Tavistock Company they will be paid over to the Coronation Company in order to keep both sets of accounts in line. Since the close of the financial year we have arranged to purchase the surface rights of the ground on which the original Tavistock pit is situated. The area purchased is over 300 acres, and we expect that the transaction will free us in future from many difficulties which we have laboured under in the past, and will provide us with our own site for erecting the surface works which will shortly be necessary. The present equipment of the Tavistock Company is quite inadequate if we intend to have an output at all equivalent to that of the present Coronation Company, and it is the intention of the board as soon as practicable to arrange for a suitable equipment which will put us into this position. This, of course, means the outlay of a considerable sum of money; but with the resources which we have already accumulated and which we hope to supplement in the future we are hopeful that we shall be able to meet the necessary expenditure without encroaching upon our ability to pay regular dividends, although, of course, the rate of dividend will depend on our ability to maintain profits. Major Bagot, who addressed you a year ago, shortly afterwards was summoned to England for service in France and is now serving our King at the War Office. I hope we shall soon have the pleasure of welcoming him back again.

Messrs. A. Aiken and H. de V. Steytler, the retiring directors, were re-elected.

The retiring auditors, Messrs. Roberts Hays and Co., were reappointed.

TAVISTOCK COAL AND COKE CO.

The second annual meeting of the Tavistock Coal and Coke Co., Ltd., was held at the National Bank boardroom, Johannesburg, on Sept. 29, Mr. A. Aiken presided and there were present Messrs. B. Price, T. G. Otley, C. E. Peirson, J. F. Rutherford and P. Richardson, representing 27,907 shares out of a total issued capital of 28,507. The chairman moved the adoption of the annual reports and accounts for the year ended June 30, 1915, which showed a profit for the year of £7,511 18s. 3d. All the directors retired and were re-elected; the retiring directors included Major the Hon. W. L. Bagot, Messrs. A. Aiken, H. de V. Steytler, J. Waldie Peirson, B. Price and J. F. Rutherford. The retiring auditor, Mr. A. E. Steytler, was re-elected.

NEW BOKSBURG.

Annual Meeting.

Mr. Dalrymple presided at the annual meeting, held on the 29th of September, in National Bank Buildings, of the New Boksburg Gold Mines. The representation was £60,507 out of £540.000 issued. The Chairman stated that the capital unexpended at the 30th of June amounted to £31,650, and the available cash on hand at that date, after making allowance for sundry creditors, was £30,048. The gross expenditure during the year was £3,733, of which claim licences absorbed £2,451. The revenue, being rents and interest, was £1,593, leaving a net expenditure for the year of £2,140. The expenditure had been kept as low as possible, and no fees had been drawn by the directors, or the London Committee. There was nothing to add to the previous reports in connection with the prospective value of the company's claims, and there was no other course open at present than to wait for further indications as to the value of the reef which might be disclosed by operations on neighbouring properties.

The report was adopted, and Messrs. Dalrymple and Gau were re-elected directors.

AFRIKANDER PROPRIETARY.

Annual Meeting.

In moving the adoption of the report of the Afrikander Proprietary Gold Mines at the annual meeting, Mr. Dalrymple said that the issue of 44,800 shares was given effect to on the the 26th of November last. Of the sum realised £39,848 was applied in repaying the company's liability to the bank, and at the 30th June last, after providing for sundry creditors, £3,355 remained in hand. The reduction of the capital of the company necessitated a similar reduction in the value of the capital assets, which, in the present balance sheet, had been written down accordingly. With the conditions prevailing, it had been impossible to make any overtures with the object of providing the company with an effective working capital. Then, also the Imperial Treasury had promulgated a notice providing that for the present new issues of capital should be approved by the Treasury before they were made, and that for issues of capital for undertakings in the British Empire Overseas, such approval would only be given where it was shown to the satisfaction of the Treasury that urgent necessity and special circumstances existed. The total expenditure for the year was £3,850, of which £559 was the expenses in connection with the reconstruction, and the balance was mainly on account of claim licences and interest on the overdraft to the date of repayment. The expenditure to date of registration by the Court of the reduction of the capital (July 21,1914), was £777, and this amount was written off. Sundry revenue amounted to £242. The property is in the hands of the caretaker. The expenditure had been kept as low as possible, and the outgoings consisted at present of little more than the claim licences, which amounted to some £1,200 per year.

The report was adopted. Messrs. D. Christopherson and E. H. Read were re-elected directors. The representation at the meeting was £50,670 out of £89,600 issued.

KLEINFONTEIN TOWNSHIP.

Annual Meeting.

At the annual meeting of Kleinfontein Estates and Township, Ltd., on Sept. 29, Colonel Dalrymple, who presided, said:—The report of the directors and statements of account for the year ended 30th June, 1915, are before you for your consideration. There was a gross profit of £7,551, to which has to be added an amount of £4,223, the balance brought forward from the previous year, making a total of £11,774 carried to the appropriation account. Of this sum an amount of £853 has been applied for depreciation of assets, £421 the estimated amount payable as income tax, £8,500 distributed to shareholders for dividends, and £2,000 carried forward to the current year. The number of stands sold was 83, and a few agricultural plots have also been disposed of. You will note from the balance sheet that, as usual, the area sold has been deducted from the farm area, and in cases where the full purchase price has not been paid the selling value has been carried to the other side of the account, under the heading of "property sales suspense." The water position is in a satisfactory state, and, notwithstanding that we are at the end of winter, the dams are practically full. On the 31st August, 1914, the total amount of water in the dams was 107,822,000 gallons, and on the 31st August of this year the amount was 846,713,000 gallons. The residential stands in the western extensions are all sold, and it is expected that the northern portion of the township will shortly be required to meet the further development of the town. The question of providing better communication between this and the older section of the township is now under consideration. We have, as in the past, endeavoured to co-operate with the Municipal Council of Benoni in the development of the township, and the relations between the Council and the company have, as in former years, been quite cordial. Interim dividend No. 23 of 5 per cent. and Nos. 24 and 25 of 2½ per cent. each, totalling in all, 10 per cent., have been declared during the year.

The report and accounts were adopted.

Colonel Dalrymple and Mr. W. J. Gau were re-elected directors.

Messrs. C. L. Andersson and Co. and F. W. Diamond and English were reappointed auditors.

THE SUB NIGEL, LIMITED.

(Incorporated in the Transvaal.)

REPORT OF THE DIRECTORS

For the Year ended 30th June, 1915.

Submitted at the Seventeenth Ordinary General Meeting of Shareholders, held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, on Friday, 24th September, 1915, at 10.45 o'clock in the forenoon.

Gentlemen,—Your Directors beg to submit their Report, together with the audited Accounts, for the year ended 30th June, 1915.

CAPITAL.

The capital of the Company, which is unchanged, consists of £475,000 in 475,000 shares of £1 each, of which 431.580 shares have been issued, fully paid, leaving 43.420 shares held in reserve.

PROPERTY.

The area of your mining property, on which claim licences are paid, is equal to an area of 1,494.2860 claims, which is the same as last year. These claims are situated on the farms Varkensfontein No. 217, Droogebult No. 350 and Noycedale No. 71, all situated in the Heidelberg District.

It is estimated by the Superintending Engineer that the claim area exhausted at 30th June, 1915, amounted to 41.53 claims, leaving 1,452.756 claims still intact, the greater proportion of which have not been exploited.

Your company also holds 6 water-rights (of which 4 are situated on the farm Bultfontein, one on farm Noycedale and one on farm Varkensfontein), one machine stand, and a 17.39 per cent. interest in the following claims and water-rights taken over from the Central Nigel Deep, Limited (in liquidation):—

(a) 15.987 claims on the farm Varkensfontein No. 217, and
(b) Two water-rights on the farms Varkensfontein and Bultfontein.

In addition your company holds the freehold of a part of the unproclaimed portion of the farm Bultfontein, in extent 608 morgen 283 square roods.

OPERATIONS.

The reports of the Superintending Engineer and Manager, which are attached, give a resumé of the operations carried out at the mine during the period under review.

ACCOUNTS.

	£	s.	d.
It will be observed from the Income and Expenditure Account that the profit on working for the year, after making provision for the expenditure of £6,311 7s. 6d. on renewals and replacements of machinery, plant, etc., amonuted to … ..	£8.394	4	3
Add: Sundry revenue from interest, dividends, etc., etc. … … … … … … … … … … .. …	4,748	14	2
making a gross profit of …	£13.142	18	5
Less: Contributions to Miners' Phthisis funds, amounts written off for depreciation, etc., provision for South African Income Tax and expenditure due to war … … … … … … … … … … … .	1,350	6	2
leaving a net profit of …	£11.792	12	3
Add: Balance at credit of Appropriation Account at 30th June, 1914 … … … … … … … … … … …	1,426	0	7
	£13,218	12	10
out of which there has been appropriated for Dividend No. 5 of 2½ per cent., declared during the year, an amount of … … … … … … … … … … … …	10,789	10	0
leaving at credit of Appropriation Account at 30th June, 1915, an amount of … … … … … … …	£2,429	2	10

WORKING CAPITAL.

	£	s.	d.	£	s.	d.
The balance of working capital unexpended at 30th June, 1915. was … … … … … … … … …				£63,356	7	0
in addition to which your Company had expended on:						
Livestock, vehicles and harness and furniture and instruments	£378	9	6			
Stores … … … … … … … … …	8,637	14	10			
Investments … … … … … … … …	10,354	8	5			
Payments in advance … … … …	2,859	4	7			
				22,229	17	4
making a total of … … … … …				£85.586	4	4

CAPITAL EXPENDITURE.

The capital expenditure for the year amounted to £44,774 3s. 7d., but of this amount £28,070 2s. 5d. had not been allocated to the various capital accounts at 30th June, 1915. The balance of £16.704 1s. 2d. was expended as follows:—

	£	s.	d.	£	s.	d.
Property (Survey fees and legal charges on claims acquired in 1914) … … … … … … … …	£129	18	10			
Shaft sinking … … … … … … …	4.043	14	5			
Development … … … … … … … …	4.624	2	4			
New Compressor plant at "C" Shaft	3.054	8	4			
New Boiler plant at "C" Shaft …	3.814	13	1			
New Condensing plant at "C" Shaft	875	4	3			
Plate bending machine … … … …	35	0	0			
Additional expenditure in connection with Dam on Blesbok Spruit…	101	14	11			
Furniture … … … .. … … … …	13	15	0			
Livestock … … … .. … … … …	11	10	0			
				£16.704	1	2

INVESTMENTS.

It will be seen that the Company's investments, which stood in the books at 30th June, 1914, at £11.064 0s. 11d., now stand at £10.354 8s. 5d., or a reduction of £709 12s. 6d., accounted for as follows:—

	£	s.	d.
Deposit of 7s. 6d. per unit on 41 natives paid to the Native Recruiting Corporation, Limited, being the number by which the complement has been increased during the year … … … …	£15	7	6
Less: Dividends for the year ended 30th June, 1915, on the Company's holdings in The Knights Deep, Limited, and Breyten Collieries, Limited, which have been credited to Investments … .. … … … … … … … … … … . .	725	0	0
	£709	12	6

The Sub Nigel, Limited—continued.

DEVELOPMENT.

The amount of £14.109 0s. 7d. standing to the debit of Exploratory Development Account at 30th June, 1914, together with an amount of £4.624 2s. 4d. expended during the past year on exploratory development, have been transferred to "Development" Account. The ore reserves of the Company were therefore represented by the sum of £18.733 2s. 11d. as at 30th June, 1915.

INCREASE OF PLANT.

Owing to delay due to the war the new plant, designed to increase the crushing capacity of the mine up to 8.000 tons per month, was only brought into commission during the last month of the financial year, when an improved tonnage of 5.950 tons was crushed. A further increase was registered during the month of July, when 6.570 tons were crushed, and it is hoped that the increase will gradually continue until the maximum tonnage is attained.

DIRECTORS.

During the period under review Mr. D. W. Rossiter was appointed a Director of the Company in the place of Mr. F. D. P. Chaplin, resigned, and on Mr. Rossiter's resignation, which took place since the close of the financial year, Mr. C. Hely-Hutchinson was appointed to fill the vacancy.

You will be asked to confirm these appointments and to elect two Directors in the places of Messrs. W. S. Smits and P. Dreyfus, who retire by rotation, but being eligible, offer themselves for re-election.

AUDITORS.

It will be necessary to fix the remuneration in respect of the past year's audit, and to elect two Auditors in the places of Messrs. Douglas, Low & Co., and Roberts, Hays & Co., who retire in accordance with the provisions of the Articles of Association, but are eligible and offer themselves for re-election.

GENERAL.

Owing to his health having broken down, Mr. C. F. Parry was compelled to relinquish the management of the mine in April last, and Mr. F. G. Dunning was appointed Manager in his stead.

Your Directors wish to place on record their appreciation of the services rendered by both of these gentlemen.

D. CHRISTOPHERSON (Chairman).
PAUL DREYFUS. Directors.
The Consolidated Gold Fields of S.A., Ltd., Secretaries.
per G. C. WHITE.

Johannesburg, 8th September, 1915.

Dr. INCOME and EXPENDITURE ACCOUNT for the Year ended 30th June, 1915. Cr.

To Mining Expenses	£48,189 19 5	
.. Ore Sorting, Crushing and Transport Expenses	2,016 3 4	
.. Milling Expenses	5,366 10 0	
.. Tube Milling Expenses	3,769 12 2	
.. Cyaniding Sand Expenses	5.137 18 4	
.. Cyaniding Slime Expenses	2,405 12 10	
.. General Mine Expenses	14,161 15 0	
.. Mine Office Expenses	1,970 5 9	
.. Head Office Expenses	3.120 10 5	
.. London and Paris Office Expenses	1,318 7 11	
.. Development	14,517 19 7	
	£101,974 14 9	
.. Expenditure on renewals and replacements of machinery, plant, etc.	6.311 7 6	£108,286 2 3
.. Balance carried down		8,394 4 3
		£116,680 6 6
To Miners' Phthisis Compensation Fund Levies under Miners' Phthisis Act for year ended 30th June, 1915.	£327 10 1	
.. South African Income Tax—provision for year ended 30th June, 1915	210 0 0	
.. Sundry amounts written off for depreciation, etc.	52 10 1	
.. Expenditure due to war	760 6 0	£1,350 6 2
.. Balance carried to Appropriation Account		11.792 12 3
NOTE.—It is estimated that no profits tax is due and payable for the year ended 30th June, 1915.		
		£13,142 18 5

By Gold Account		£116,680 6 6
		£116,680 6 6
By Balance brought down		£8,394 4 3
.. Interest, Commission and Exchange	£3,968 5 6	
.. Rents from quarters, less maintenance	315 3 1	
.. Sundry Revenue	429 8 1	
.. Transfer and remove fees	35 17 6	4,748 14 2
		£13,142 18 5

Dr. APPROPRIATION ACCOUNT. Cr.

To Dividend No. 5 (2½ per cent., December, 1914)	£10,789 10 0
.. Balance carried to Balance Sheet	2,429 2 10
	£13,218 12 10

By Balance at 30th June, 1914	£1,426 0 7
.. Balance from Income and Expenditure Account	11,792 12 3
	£13,218 12 10

The Sub Nigel, Limited—continued.

BALANCE SHEET at 30th June, 1915.

Dr.		
To Capital Account		£431,580 0 0
475,000 shares of £1 each	£475,000 0 0	
Less—43,420 shares of £1 each held in reserve	43,420 0 0	
,, Sundry Creditors		9,788 6 7
Open accounts, wages, stores and sundries.		
,, Dividends unclaimed (per contra)		565 19 10
,, Appropriation Account		2.429 2 10
Balance at 30th June, 1915.		
Contingent Liabilities—		
Balance payable on uncompleted contracts for Machinery, Plant, etc.	£474 11 5	
8s. per share unpaid on 158 shares of £1 each of the Witwatersrand Native Labour Association, Ltd.	63 4 0	
12s. 6d. per native on complement of 946 natives uncalled by the Native Recruiting Corporation, Limited	591 5 0	
	£1,129 0 5	
		£444,363 9 3

		Cr.
By Property (at cost, less amounts written off)		£124,293 9 11
Balance at 30th June, 1914	£124,163 11 1	
Consisting of 1,494·286 claims on farms Varkensfontein, Droogebult and Noycedale.		
It is estimated by the Superintending Engineer that of the above claimholding there still remained an intact area, at 30th June, 1915, of 1,452·756 claims.		
The Company also holds:		
(a) Six water-rights, four on farm Bultfontein, one on farm Noycedale, and one on farm Varkensfontein.		
(b) The freehold of a portion of the unproclaimed portion of the farm Bultfontein, in extent 608 morgen 283 square roods.		
(c) A 17·39 per cent. interest in 15·987 claims on the farm Varkensfontein, and in two water-rights on the farms Varkensfontein and Bultfontein.		
Add—Survey fees and legal charges on claims, etc., purchased during 1914	129 18 10	
,, Shaft sinking (book value)		66,270 15 5
,, Development		18,733 2 11
,, Expenditure to date on equipment of Property		108,551 13 3
(at cost, less amounts written off.)		
Shafts—Surface Plant	49,887 15 5	
Shafts—Underground Plant	10.233 12 8	
Workshops and general Buildings	14.486 6 11	
Machinery and Plant	3,591 19 8	
Reduction Works	30,351 18 7	
,, Capital Expenditure on uncompleted estimates at date		28,070 2 5
,, Expenditure on Fencing		74 11 9
,, Furniture and Instruments		265 14 6
,, Livestock, Vehicles and Harness		112 15 0
,, Stores on hand		8,637 14 10
,, Share Investments and interests in other concerns		10,354 8 5
(at or under cost.)		
3,100 shares of £1 each in The Knights Deep, Limited, fully paid 158 shares of £1 each in the Witwatersrand Native Labour Association, Limited, 12s. paid 3.000 shares of £1 each in the Breyten Collieries, Limited, fully paid 7 shares of £1 each in the Native Recruiting Corporation, Ltd., fully paid	9,999 13 5	
and deposit of 7s. 6d. each on the total complement of 946 natives, being part of the total liability under agreement of £1 per native	354 15 0	
,, Payments in advance		2,859 4 7
,, Sundry Debtors		4,143 16 7
,, Gold in transit		8,057 8 10
,, Cash at Bankers, London and Johannesburg		565 19 10
For dividends unclaimed (per contra).		
,, Cash, London, Johannesburg, and at mine (including cash on deposit with Bankers)		63,402 11 0
		£444,363 9 3

THE CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA, LIMITED,
Secretaries
per G. C. WHITE.

D. CHRISTOPHERSON
(Chairman),
PAUL DREYFUS.
Directors.

REPORT.

To the Shareholders of
The Sub Nigel, Limited.

We report that we have examined the above Balance Sheet with the books and vouchers of the Company in Johannesburg, for the year ended 30th June, 1915, in which have been incorporated the audited accounts received from London, and the accounts received from the mine, and have obtained all the information and explanations we have required as Auditors. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs, according to the best of our information and the explanations given to us, and as shown by the books of the Company.

DOUGLAS, LOW & CO.
(Incorporated Accountants),
ROBERTS, HAYS & CO.
(Chartered Accountants),
Auditors.

Johannesburg, 20th August, 1915.

THE SIMMER & JACK PROPRIETARY MINES, LIMITED.

(Incorporated in the Transvaal.)

REPORT OF THE DIRECTORS

For the Year ended 30th June, 1915.

Submitted at the Seventeenth Ordinary General Meeting of Shareholders, held in the Board Room, Consolidated, Gold Fields Buildings, Simmonds Street, Johannesburg, on Friday, 24th September, 1915, at 11.30 o'clock in the forenoon.

Gentlemen.—Your Directors beg to submit their Report, together with the audited Accounts, for the year ended 30th June, 1915.

CAPITAL.

The Capital of the Company, which is unchanged, consists of £3,000,000, in 3,000,000 shares of £1 each, all of which have been issued, fully paid.

PROPERTY.

The area of your mining property, on which claim licences and mynpacht dues are paid, is equal to a claim area of 624.270 claims, which is the same as last year. The claims are held as to 425.086 under claim licences and 199.184 under mynpacht title, and are situated on the farm Elandsfontein No. 11.

Of the above claims held under mynpacht title, the New Primrose Gold Mining Company, Limited, have the lease of 3.428 claims for mining purposes and the surface rights of 11.599 claims. Of the total number of claims, 246.07, however, lie to the north of the outcrop.

It is estimated by the Superintending Engineer that the intact claim area at 30th June, 1915, was equal to 122.084 claims, of which 25.817 claims are in dyke, leaving an intact reef-bearing area equal to 96.267 claims, in addition to which a considerable tonnage of ore is available as reclamation from areas already stoped out.

Your Company also owns seven machine stands (five of which are leased to the Victohia Falls and Transvaal Power Company, Limited), four diggers' stands, all of which are under lease, and seven water-rights, six of which are situated on the farm Elandsfontein No. 11, and one, which was acquired during the year, on the farm Driefontein No. 1.

In addition to the above, your Company holds the right, under a lease from the Rand Mines, Limited, to the water in the water-right on Elandsfontein No. 6, forming a portion of Victoria Lake.

The area of your Company's freehold title, which consists of a portion of the farm Elandsfontein No. 11, comprised, at 30th June, 1914, 1,264 morgen 231 square roods 20 square feet.

Of the above area, a portion, 142 morgen 468 square roods 6 square feet in extent, has been laid out into the following Townships: Germiston and North Germiston (which are owned in their entirety by the Company), East Germiston, West Germiston, Germiston Extension, and a portion of South Germiston (in which Townships the Company holds a two-thirds interest), and the Company's portion of the Primrose Township, leaving the area of the Company's freehold (exclusive of the freehold area undisposed of in the Townships which is shown below) at 30th June, 1915, at 1.121 morgen 363 square roods 14 square feet.

The freehold ground in the above Townships still available for disposal at 30th June, 1915, was equal to an area of 51 morgen 242 square roods 22 square feet, arrived at as follows:—

	Morgen.	Sq. Roods.	Sq. Feet.
Total area	142	468	6
Less: Area covered by streets, lanes, open spaces, parks and railway expropriations	53	266	18
	89	201	132
Less: Area of freehold lots disposed of	37	559	110
Leaving an area still available for disposal of	51	242	22

The number of stands unsold in the Townships at 30th June, 1915, was as follows: In Germiston Township, 143; North Germiston Township, 34; East Germiston Township, 8; West Germiston Township, 6; Germiston Extension Township, 5; South Germiston Township, 51; and Primrose Township, 43.

The Property Account in the Balance Sheet has been sub-divided to show under the heading of Interests in Townships the estimated value of your Company's interest in the unsold freehold of all the above stands. A separate heading, "Buildings in Townships," shows the book value of Buildings in those Townships belonging to your Company (viz., 26 Cottages and the Germiston Estste House and Offices), leaving under the remaining heading, "Mynpacht and Claim Areas, Water-rights and Freehold," the book value attaching to your Company's mining titles and of its freehold ownership other than in the Townships mentioned.

The Simmer and Jack Proprietary Mines, Limited—continued.

Under this re-arrangement the heading "Elandsfontein Estate," under which has previously been shown the book value of the buildings above-mentioned, and an estimate of the value of your Company's interest in the unsold leasehold of the stands in the different Townships, disappears from the Balance Sheet.

OPERATIONS.

The Superintending Engineer's and Manager's Reports, which are attached, give a *resumé* of the operations conducted at the mine during the period under review.

ACCOUNTS.

It will be observed from the Income and Expenditure Account that the profit on working for the year, after taking into account the expenditure of £4.179 16s. 10d. on renewals and replacements of machinery, plant, etc., amounted to			£334,556 3 5
Add: Sundry Revenue			26,016 17 7
			£360.573 1 0
Deduct: Contributions to the Miners' Phthisis Compensation Fund; estimated Profits Tax and Income Tax for the year; expenditure due to the present war and sundry amounts written off ...			64,193 7 2
making a total credit to Appropriation Amount of...			296.379 13 10
Add: Balance at credit of Appropriation Account at 30th June, 1914			85,816 13 9
			£382.196 7 7
From this amount there was appropriated:—			
For Dividends Nos. 25 and 26 of 5 per cent. each, declared during the year		£300.000 0 0	
For reserve for machinery, additions and renewals	£7.500 0 0		
Less: Expended on renewals and replacements and charged to working costs	4.179 16 10		
		3.320 3 2	
			303.320 3 2
leaving a credit balance to Appropriation Account at 30th June, 1915, of			£78.876 4 5

CAPITAL EXPENDITURE.

The amount expended during the year on equipment of property, including shaft sinking, was £3.018 18s. 7d.

GOLD IN RESERVE.

The gold in reserve at 30th June, 1915, amounted to 8.550 ounces, of a value of £35,838 14s. 11d.

INVESTMENTS.

Your investments, which stood in the books at 30th June, 1914 at £52.590 19s. 1d., now stands at £26.247 2s. 9d., or a difference of £26.343 16s. 4d., which is accounted for as follows:—

124 shares in the Witwatersrand Co-operative Smelting Works, Ltd., 8s. paid, disposed of during the year	£49 12 0	
Depreciation written off book value of Company's shareholding in The Simmer Deep, Ltd.	25.483 9 4	
Dividends for the year ended 30th June, 1915, on Company's shareholding in Breyten Collieries, Ltd., credited to Investments	1,006 17 6	
		£26.539 13 1
Less: Deposit of 7s. 6d. per unit on 523 natives paid to the Native Recruiting Corporation, Ltd., being the number by which the complement has been increased during the year		196 2 6
		£26,343 16 4

A list of the investments is shown in the Balance Sheet, and in addition the Company holds 45.034 fully paid 6 per cent. preference shares of £1 each of The Victoria Falls and Transvaal Power Co., Ltd., which have been ear-marked as an investment for the purpose of the Additions and Renewals Fund.

DIRECTORATE.

During the year Mr. W. S. Smits was elected a Director of the Company in the place of Mr. W. Hume, resigned, and Mr. D. W. Rossiter was appointed to fill the vacancy caused by the resignation of Mr. F. D. P. Chaplin.

On the resignation of Mr. D. W. Rossiter, which took place since the close of the financial year, Mr. C. Hely-Hutchinson was appointed to fill the vacancy.

You will be asked to confirm these appointments and to elect two Directors in the place of Messrs. D. Christopherson and F. Leslie Brown, who retire by rotation, but are eligible and offer themselves for re-election.

AUDITORS.

It will be necessary to fix the remuneration for the past year's audit, and to elect two Auditors in the places of Messrs. Douglas, Low & Co., and Mr. T. A. White, who retire in accordance with the provisions of the Articles of Association, but are eligible and offer themselves for re-election.

GENERAL.

Mr. O. P. Powell continued to act as the Manager of the Company's mine during the year, and your Directors desire to record their sincere appreciation of his services.

D. CHRISTOPHERSON (Chairman),
F. LESLIE BROWN, Directors.
The Consolidated Gold Fields of S.A., Ltd., Secretaries,
per G. C. WHITE.

Johannesburg, 13th September, 1915.

APPROPRIATION ACCOUNT.

Dr.			Cr.	
To Dividends		£300,000 0 0	By Balance at 30th June, 1914	£85,816 13 9
Dividend No. 25 of 5 per cent., declared 15th December, 1914	£150.000 0 0		,, Balance from Working Expenditure and Revenue Account for the year ended 30th June, 1915	296.379 13 10
Dividend No. 26 of 5 per cent., declared 18th June, 1915	150,000 0 0			
,, Reserve for additions to and renewals of Machinery and Plant		3,320 3 2		
Further provision as voted—amount equal to 2½ per cent. of Dividends Nos. 25 and 26	7.500 0 0			
Less—Amounts expended on renewals and replacements, and charged to Working Expenditure and Revenue Account as above ...	4,179 16 10			
,, Balance carried to Balance Sheet .		78,876 4 5		
		£382,196 7 7		£382,196 7 7

The Simmer and Jack Proprietary Mines, Limited—continued.

BALANCE SHEET at 30th JUNE, 1915.

Dr.			
To Capital Account ..... 3,000,000 shares of £1 each, all of which are issued.			£3,000,000 0 0
,, Reserve Account			630,741 17 9
Balance at 30th June, 1914		£656,225 7 1	
Less—Depreciation written off Share Investments		25,483 9 4	
,, Amounts Appropriated for Capital Expenditure			335,909 19 6
Balance at 30th June, 1914		333.884 1 9	
Add—Additional Capital Expenditure during the year transferred from Additions and Renewals Fund		2,025 17 9	
,, Fund for Additions to and Renewals of Machinery and Plant ...			67,729 4 0
Balance at 30th June, 1914	£66,434 18 7		
Add—Further Appropriation	7,500 0 0	73,934 18 7	
Less—Charged to Working Expenditure and Revenue Account	4,179 16 10		
Amounts written off for Additions during the year	2,025 17 9	6,205 14 7	
,, Reserve Gold			35,838 14 11
,, Reserve for redemption of Germiston Cottages and Simmer and Jack Hospital (Buildings and Furniture)			7,935 18 1
,, Sundry Creditors			239,324 12 6
Open Accounts for Wages, Stores, and Sundries		40,349 6 10	
Sundry Shareholders' Dividend No. 26 of 5 per cent.		150,000 0 0	
Government of the Union of South Africa—Profits Tax, Income Tax and Special War Levy ...		48,975 5 8	
,, Dividends unclaimed, per contra ...			33,684 8 8
,, Balance from Appropriation Account			78,876 4 5
Contingent Liabilities—			
Balance payable on uncompleted Contracts		£8,906 1 7	
Amounts uncalled, on shares held—			
12s. per share on 2,129 Witwatersrand Co-operative Smelting Works, Limited, shares		1.277 8 0	
8s. per share on 862 Witwatersrand Native Labour Association, Limited, shares		344 16 0	
Native Recruiting Corporation, Limited, Deposit Account—12s. 6d. per native uncalled on complement of 4,866 natives ...		3,041 5 0	
		£13,569 10 7	
Carried forward			£4,430,040 19 10

Cr.		
By Property Account (at cost, less sundry Credits)		£2,547,761 17 2
Mynpacht, Claim Areas, Water-rights and Freehold	£2,487,948 18 3	
It is estimated by the Company's Superintending Engineer that at 30th June, 1915, there remained intact a reef-bearing area equal to 96·267 claims, in addition to a considerable tonnage of ore available as reclamation from areas already stoped out.		
Estimated value of the Company's interests in the following Townships: Germiston, West Germiston, North Germiston, East Germiston, South Germiston, Germiston Extension, and Primrose	48,677 0 0	
Buildings on Townships	11,135 18 11	
,, Expenditure to date on equipment of Property—less amounts written off		1,409,143 17 0
Shaft sinking	242,915 7 6	
Buildings	159,085 12 6	
Machinery and Plant	907,030 13 8	
Water Service	80,666 2 11	
Simmer and Jack Hospital (Buildings and Furniture) .	16,809 9 9	
Swimming Bath	1,160 10 5	
Simmer Railway Siding	1,086 9 0	
Simmer and Jack Mess Equipment	309 11 3	
Metallurgical Laboratory	80 0 0	
,, Livestock, Vehicles and Harness (including Motor Vehicles)		643 7 0
,, Office and other Furniture		988 9 8
,, Stores and Material on hand, including Machinery not erected		45,916 9 7
,, Payments in advance		5,799 1 6
Native Labour Recruiting Expenses	3,837 18 8	
Claim Licences and Sundries	1,961 2 10	
,, Investments and Interests in other concerns (at or under cost)		26,247 2 9
59,516 4/16 Simmer Deep, Ltd., shares of £1 each, fully paid	24.422 7 9	
2,129 Witwatersrand Co-operative Smelting Works, Ltd., shares of £1 each, 8s. paid		
14,000 Victoria Falls and Transvaal Power Company, Ltd., 6 per cent. Preference shares of £1 each, fully paid		
8,500 Victoria Falls and Transvaal Power Company, Ltd., Ordinary shares of £1 each, fully paid		
862 Witwatersrand Native Labour Association, Ltd., shares of £1 each, 12s. paid.		
194 Rand Mutual Assurance Company, Ltd., shares of £10 each, fully paid		
8,950 Breyten Collieries, Ltd., shares of £1 each, fully paid.		
46 Native Recruiting Corporation, Ltd., shares of £1 each, fully paid		
Native Recruiting Corporation, Ltd.—deposit of 7s. 6d. each on the total complement of 4,866 natives, being part of total liabiliy, under agreement, of £1 per native	1,824 15 0	
,, Investment of Reserve Fund for Additions to and Renewals of Machinery and Plant (at cost)		45,034 0 0
45,034 Victoria Falls and Transvaal Power Company, Ltd., 6 per cent. Preference shares of £1 each, fully paid.		
Carried forward		£4,081.534 4 8

The Simmer and Jack Proprietary Mines, Limited—continued.

Dr. BALANCE SHEET at 30th JUNE, 1915—continued. Cr.

Dr.		Cr.	
		Brought forward	£4,081,534 4 8
Brought forward	£4,430,040 19 10	To Sundry Debtors	24,642 2 7
		,, Gold in transit	56,294 12 0
		,, Cash at Bankers, London and Johannesburg For dividends unclaimed, per contra.	33,684 8 8
		,, Cash On fixed deposit, and at Bankers, London, Johannesburg, Germiston, and on hand at mine.	233,885 11 11
	£4,430,040 19 10		£4,430,040 19 10

WORKING EXPENDITURE and REVENUE ACCOUNT for the Year ended 30th June, 1915.

To Mining Expenses......		£348,745 9 6		By Gold Account	£866,619 3 4	
Mining and Pumping	£325,081 16 7			,, Accumulated Slime	1,389 8 6	
Development	23,663 12 11					£868,008 11 10
,, Reduction Expenses		139,959 5 3				
Sorting, Crushing and Transport of Quartz	15,957 6 8					
Milling Expenses	39,002 11 2					
Tube Milling Expenses	23,558 16 9					
Sand Expenses	36,153 5 3					
Slime Expenses	25.287 5 5					
,, General Expenses—Mine.		30,171 3 3				
,, Expenditure on Renewals and Replacements of Machinery, Plant, Buildings, etc.		4.179 16 10				
,, Head, London, and Paris Offices' Expenses		10,396 13 7				
			£533,452 8 5			
,, Balance, being Profit on Working, carried down			334,556 3 5			
			£868,008 11 10			£868,008 11 10
To Miners' Phthisis Compensation Fund		£9,441 19 9		By Balance brought down		£334,556 3 5
Levies under Miners' Phthisis Act for year ended 30th June, 1915.				,, Elandsfontein Revenue	£11,824 16 11	
,, Sundry amounts written off		780 4 2		,, Interest, Commission and Exchange	4,489 3 5	
,, Expenditure due to war		4,316 8 2		,, Rents received, less maintenance	2,636 14 11	
,, Profits Tax		48,108 2 2		,, Sale of Water	977 15 7	
Provision for the year ended 30th June, 1915	£31,973 4 0			,, Dividends on Investments	4,441 1 7	
Add — Amount underestimated for the year ended 30th June, 1914	134 18 2			,, Transfer Fees	87 13 6	
Provision for special war levy in terms of Act 24 of 1915	16,000 0 0			,, Sundry Revenue	1,559 11 8	
						26,016 17 7
,, South African Income Tax		1,546 12 11				
Income Tax for the year ended 30th June, 1914	544 11 3					
Add—Provision for the year ended 30th June, 1915	1,002 1 8					
			£64,193 7 2			
,, Balance carried to Appropriation Account			296,379 13 10			
			£360,573 1 0			£360,573 1 0

THE CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA, LIMITED,
Secretaries

per G. C. WHITE.

D. CHRISTOPHERSON
(Chairman),
F. LESLIE BROWN,
Directors.

REPORT.

To the Shareholders of
The Simmer and Jack Proprietary Mines, Limited.

We report that we have examined the above Balance Sheet with the books and vouchers of the Company in Johannesburg for the year ended 30th June, 1915, in which have been incorporated the audited Accounts received from London, and have obtained all the information and explanations we have required as Auditors. In our opinion such Balance Sheet is properly drawn up so as to exhibit true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us, and as shown by the books of the Company.

DOUGLAS. LOW & CO.,
T. A. WHITE,
(Incorporated Accountants),
Auditors.

Johannesburg, 4th September, 1915.

NOURSE MINES, LIMITED.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Nineteenth Ordinary General Meeting of Shareholders for the year ended 30th June, 1915, will be held in the Board Room, The Corner House, Johannesburg, **on Wednesday, 24th November, 1915, at 12 noon,** for the following business:—

1. To receive and consider the Balance Sheet and Accounts for the year ended 30th June, 1915, and the Reports of the Directors and Auditors.
2. To elect Directors in the place of those retiring in accordance with the provisions of the Company's Articles of Association.
3. To determine the remuneration of the Auditors for the past Audit and to appoint Auditors for the ensuing year.
4. To transact any other business which may be transacted at an Ordinary General Meeting, or which is brought under consideration by the Report of the Directors.

The Share Transfer Books of the Company will be closed from the 24th November, 1915, to the 30th November, 1915, both days inclusive.

Holders of Share Warrants who desire to be present or represented at the Meeting shall produce their Share Warrants (or may at their option deposit same), at the places and within the times following:—

(a) At the Head Office of the Company in Johannesburg, at least twenty-four hours before the time appointed for the holding of the Meeting;

(b) At the London Office of the Company, No. 1, London Wall Buildings, London, E.C., at least thirty days before the date appointed for the holding of the Meeting;

(c) At the Office of the Credit Mobilier Francais, 30 and 32, Rue Taitbout, Paris, at least thirty days before the date appointed for the holding of the Meeting;

and shall otherwise comply with the "Conditions as to the issue of Share Warrants" now in force.

Upon such production or deposit a Certificate, with Proxy Form, will be issued under which such Share Warrant holders may attend the Meeting either in person or by proxy.

By Order of the Board,
RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

Head Office: The Corner House,
Johannesburg, Transvaal,
30th September, 1915.

REPORT OF THE DIRECTORS

For the Year ended 30th June, 1915.

To be submitted at the Nineteenth Ordinary General Meeting of Shareholders, convened for Wednesday, 24th November, 1915, at 12 noon, in the Board Room, 2nd Floor, The Corner House, Johannesburg.

To the Shareholders,
NOURSE MINES, LIMITED.

Gentlemen,—Yours Directors beg to submit their Nineteenth Report and Audited Accounts for the year ended 30th June, 1915, accompanied by reports of the Consulting Engineer and Manager.

PROPERTY.

No change has taken place in the claim property, which remains at 647.4337 mining claims and mining rights leased from the Government over an area equivalent to 21.9616 claims. The area of your freehold property on the farm Doornfontein No. 24 is 446 morgen 106.12 square roods, 10 water-rights and 8 mining stands.

OPERATIONS.

The particulars of the results of the last year's operations, the development accomplished, and the ore reserves and values, are dealt with in the reports of the Consulting Engineer and Manager, to which your attention is directed.

ACCOUNTS.

Mining operations for the year have resulted in a profit of £158,043 9s. 6d., which is £34,183 4s. 7d. less than the previous year, although 62,600 tons more were crushed. The value of the ore treated showed a decrease of 2s. 1d. per ton, and working costs were 3d. per ton less. The profit was adversely affected by reason of the necessity for the performance of a considerable amount of maintenance work, an increase in the cost of several items of stores and in the cost of realising gold. Payments amounting to £1,510 17s. 4d. and £12,438 16s. 3d. have been made respectively on account of donations and contributions to War Funds, etc. which, of necessity, are greater this year, and to the assessment under the Miners' Phthisis Act (Compensation Fund). Freehold and other items of revenue amount of £7,531 18s. 7d., leaving a net profit for the year's operations of £151,625 14s. 6d. The balance unappropriated at 30th June, 1914, was £96,568 14s. 3d., and £20 15s. 11d. dividends unclaimed for five years have been forfeited in terms of the Articles of Association, giving a total of £248,215 4s. 8d., which has been dealt with as follows:—

Net expenditure on Capital Account	£415	1	9
Government Taxes...	21,079	18	2
Interim Dividends Nos. 21 and 22 of $8\frac{3}{4}$ per cent. and 5 per cent. respectively... ...	113,825	7	9
	£135,320	7	8
Balance unappropriated, represented by cash and cash assets, less liabilities...	112,894	17	0
	£248,215	4	8

A special War levy on the Mining Industry of £500,000 has been made by the Union of South Africa in respect of its financial year ending 31st March, 1916. This tax, which will be distributed amongst Gold Mining Companies pro rata to the amount paid by them under the Mining Taxation Act, 1910, during the same period, cannot be accurately ascertained until all returns are made to the Government in this respect. Provision has been made in the Balance Sheet for the estimated assessment under the Act, amounting to £7,000, which sum has been charged to Appropriation Account in the accounts now submitted. The amount of the tax is payable as regards 50 per cent. on the 31st December, 1915, and the balance on 31st March, 1916.

DIVIDENDS.

Two Interim Dividends, Nos. 21 of $8\frac{3}{4}$ per cent. and 22 of 5 per cent., absorbing £113,825 7s. 9d., were declared for the year ending 30th June, 1915. Sums due to registered shareholders resident in enemy territories were paid over to the Bank of England for the credit of the Public Trustee in accordance with the official direction of the Custodian in terms of the Trading with the Enemy Amendment Act, 1914 (England).

Nourse Mines, Limited—continued.

DIRECTORS.

Mr. H. C. Boyd and Mr. E. J. Renaud retire from the Board in terms of the Articles of Association, but are eligible and offer themselves for re-election.

Your Directors regret to have to record the death of Mr. C. Rube, who for many years was a valued member of the London Committee.

AUDITORS.

You are requested to determine the remuneration of the Auditors for the past audit, and to appoint Auditors for the ensuing year.

GENERAL.

The results for the period covered by this report have been affected by the European War, a Rebellion in the Union of South Africa, and by the raising of a military force for the conquest and occupation of German South-West Africa. In common with other large employers of labour, your Company allowed half-pay to married men and assisted the dependents of single men in its service who enrolled for military duty in South-West Africa. The same allowances have been extended to men who volunteer for active service with the Overseas Contingent being raised. The War has also been responsible for advances in prices of general mining supplies and in the cost of living, to meet which the Company has made an allowance to lower paid employees to whom any additional costs is a matter of moment.

It will be noticed that the value of stores on hand has considerably increased. This is due to the laying in of large stocks of stores which are essential to the continuation of mining and milling operations.

The gold produced is being realised under arrangements made with the Bank of England.

H. C. BOYD, Chairman.

E. A. WALLERS,
F. RALEIGH,
S. C. BLACK,
H. NOURSE,
J. L. JOURDAN,
A. G. GILL,
W. T. GRAHAM,
Directors.

RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

Johannesburg, 24th August, 1915.

CONSULTING ENGINEER'S REPORT.

The Chairman and Directors,
NOURSE MINES, LIMITED.

Gentlemen,—The operations for the year, though conducted on a greater scale than in the preceding year, resulted in a reduced profit, viz., £158,043, as compared with £192,227.

The reduced profit is due to the lower value of the ore mined, as working costs were slightly lower than in the previous year.

The lower costs are satisfactory, taking into consideration the increased amount of development work and a certain number of disabilities connected with the war. The South Nourse Section, which produces very little ore for milling, entails a heavy expenditure for equipment and shaft sinking, which is practically all charged to working account.

The labour supply was inadequate in the earlier months of the year, but showed gradual improvement in the second half. The increased supply was utilised as much as possible in hand stoping. In a steep and heavily-faulted mine such as this, the forced use of rock drills in stoping has a detrimental effect on the quality of the ore mined and the condition of the underground workings.

The amount of development work accomplished totalled 26,411 feet—a considerable improvement. The South Nourse Main Incline Shaft was deepened a further 330 feet, and is now well below the 24th level, which will be equipped as a main station and concentrating level. Several subsidiary development inclines in different sections of the mine have made good progress, and will serve to open up undeveloped areas more rapidly.

A considerable amount of attention has been devoted to testing the Main Reef and Leader in the older portions of the mine, which have hitherto produced a larger proportion of South Reef. A fair percentage of payable but low-grade ore has been disclosed in this manner.

Taken as a whole, the tonnage developed for the year has not been very encouraging, the proportion of unpayable ore being large.

The payable ore developed for the year totalled 892,300 tons, of an estimated value of 5.5 dwts. per ton.

The payable ore reserve has been re-estimated and re-valued, and is as follows:—

		Value.		
	Tons.	Dwts.	s.	d.
Main Reef	1,116,900	5.1	21	5
Main Reef Leader	696,600	6.3	26	6
South Reef	1,138,900	6.0	25	2
Total and averages	2,952,400	5.7	23	11

The above estimate is based on stoping widths averaging 74, 46 and 60 inches in the three reefs respectively.

Compared with the reserve of the preceding year, there is shown an increase in tonnage of 478,700 tons and a decrease value of 0.7 dwt. per ton. The increase in tonnage is partly due to excess development and partly to the increased stoping widths used in the estimate. The decrease in value is partly due to this latter feature, and to some extent to the gradually increasing quantity of low grade Main Reef developed.

In addition to the reserve, there are developed in the mine 319,400 tons of a value between 3.8 and 4.3 dwts., the figure taken for the year's general pay limit.

The benefits derived from the general scheme of concentration, which was referred to in last year's report as practically completed, have been considerable, in so far as such a system can be applied to a mine where the workings are so scattered and numerous.

The labour employed during the year averaged 550 whites and 4,513 coloured, as compared with 565 whites and 3,515 coloured in the preceding year.

It is impossible to forecast values that may be obtained in the future development of the deeper levels in the South Nourse Section. Recently more promising values have been disclosed in the western portion of this area, and it is quite possible that good blocks of ore will be opened up here. However, on the whole, the present indications are that we must look forward to a low grade of ore of a value approximating that of the average of the present ore reserve.

Attached to the report is a plan of the underground workings, drawn on a larger scale, in the hope that the position of the mine can be more clearly followed than last year.

The Manager and his Staff have been most energetic in endeavouring to overcome the difficult conditions that are so well known on this mine, and the results are by no means the measure of these efforts.

Yours faithfully,

HY. STUART MARTIN.
Consulting Engineer.

Johannesburg, 13th August, 1915.

Nourse Mines, Limited—continued.

Dr. BALANCE SHEET, 30th JUNE, 1915. Cr.

To Capital Account—			
Authorised—			
850,000 Shares of £1 each		£850,000 0 0	
Less— 22,179 Shares of £1 each in Reserve... ...		22,179 0 0	
Issued 827,821 Shares of £1 each			£827,821 0 0
,, Funds Transferred from Appropriation Account—			
For Expenditure on Property, Development and Equipment in excess of Working Capital provided—			
As per Balance Sheet, June 30, 1914		255,676 0 4	
For the year ending June 30, 1915		415 1 9	
			256,091 2 1
,, Union of S.A. Annuity Account—			
For total amount payable (in fifteen annual instalments of £1,632 each) as consideration for grant of mining rights under certain Waterrights, Bewaarplaatsen and Machine Stands, as per Balance Sheet, 31st July, 1912		24,480 0 0	
Less Annuities paid to 1st August, 1914, and proportion provided for period from that date to 30th June, 1915		6,392 0 0	
			18,088 0 0
			1,102,000 2 1
,, Sundry Shareholders—			
Unpaid and unclaimed dividends. .		43,419 18 0	
,, Sundry Creditors—			
Wages, stores, etc.	£47,627 10 6		
Union of South Africa—Tax on profits, etc., £14,463 8s. 1d; Special War Levy (estimated), £7,000	21,463 8 1		
		69,090 18 7	
			112,510 16 7
,, Balance of Appropriation Account—			
Unappropriated			112,894 17 0
Notes.—There are further liabilities as under:—			
I.—On account of shares subscribed for in other Companies, viz.:—			
Co-operative Exchange Yard, Ltd.—			
£64 per share uncalled on 80 shares		£5,120 0 0	
W.N.L.A. Assoction, Ltd.—			
8s per share uncalled on 1,415 shares		566 0 0	
Witwatersrand Co-operative Smelting Works, Ltd.—			
12s. per share uncalled on 1,408 shares		844 16 0	
		£6,530 16 0	
II.—Native Recruiting Corporation, Ltd., Deposit Account, 12s. 6d. per Native on complement of 5,883 Natives.			
			£1,327,405 15 8

By Property, Development and Equipment—			
As per Balance Sheet, June 30, 1914		£1,103,217 0 4	
Less Equipment—			
Net proceeds of Plant, etc., sold during the year ending June 30, 1915 ... ... (Vide Manager's Report.)		1,216 18 3	
			£1,102,000 2 1
,, Shares in other Companies at cost—			
Co-operative Exchange Yard, Ltd.— 80 £80 shares, £16 per share paid ...	£1,280 0 0		
Rand Mutual Assurance Co., Ltd.— 340 £10 shares, fully paid	3,400 0 0		
W.N.L.A., Ltd.— 1,415 £1 shares, 12s. per share paid ...	849 0 0		
Witwatersrand Co-operative Smelting Works, Ltd.— 1,408 £1 shares, 8s. per share paid ...	563 4 0		
Native Recruiting Corporation, Ltd.— 57 £1 shares, fully paid	57 0 0		
		6,149 4 0	
,, Stores and Materials—			
In stock...	25,899 10 6		
In transit...	477 17 0		
Cyanide Shipments detained in Foreign Ports...	737 6 0		
	£27,114 13 6		
,, Live Stock, Vehicles, etc.	883 0 0		
,, Furniture	196 6 0		
,, Share Warrants	124 0 4		
,, Plantations	497 15 9		
		28,815 15 7	
,, Sundry Debtors and Payments in Advance		12,609 12 11	
		47,574 12 6	
,, Deposits—Fixed and on Call, bearing interest...	117,502 15 8		
,, Cash at Bankers and in hand	6,484 17 9		
,, Gold Consignment Account	53,843 7 8		
		177,831 1 1	
			225,405 13 7
			£1,327,405 15 8

RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

H. C. BOYD, Chairman.
S. C. BLACK, Director.

To the Shareholders,
NOURSE MINES, LIMITED.

We have audited the Balance Sheet of the Nourse Mines, Ltd., dated the 30th June, 1915, above set forth, and have obtained all the information and explanations we have required. In our opinion, such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given us and as shown by the books of the Company.

C. L. ANDERSSON & CO.,
J. N. WEBB,
(Incorporated Accountants), Auditors

Johannesburg, 19th August, 1915.

Nourse Mines, Limited—continued.

Dr. Working Expenditure and Revenue Account for the Year ending 30th June, 1915. Cr.

Dr.			
To Working Expenditure at Mine—			
White wages … …	£188,672 4 10		
Coloured wages … …	134,267 7 0		
Stores and Materials	192,838 15 9		
All other costs, including purchase of power, native recruiting fees, sanitation charges, insurance premiums. Miners' Phthisis Insurance Fund Assessment, Rand Water Board fixed charges, work carried on by outside contractors, etc. …	97,460 16 2		
		£613,239 3 9	
,, General Expenses— Head Office—			
Salaries, agency fees, and rent … … …	8,211 4 1		
Stationery, printing, advertising, postages, and telegrams	1,039 18 8		
Directors and Auditors' Fees . . … …	3,025 0 0		
Licences … … … …	5,197 0 0		
Sundry… .. … .. …	725 9 1		
		18,198 11 10	
			£631,437 15 7
,, Credit balance on Working for the year carried down … … … … …			158,043 9 6
			£789,481 5 1
To Donations and Contributions to War Relief Funds, etc.… … … … .. …		1,510 17 4	
,, Miners' Phthisis Act— Assessment under Miners' Phthisis Act, 1912, in respect of Compensation Fund… … … … … … …		12,438 16 3	
			£13,949 13 7
,, Credit Balance carried to Appropriation Account … … .. … …			151,625 14 6
			£165,575 8 1

Cr.		
By Gold Account … … … … .. …		£789,481 5 1
		£789,481 5 1
By Balance brought down … … … …		£158,043 9 6
,, Freehold Revenue … … … … … …	£2,619 5 4	
,, Sundry Revenue … … … … … …	2 9 2	
,, Interest and Exchange … … … …	2,695 10 3	
,, Rand Mines Power Supply Co., Ltd.— Liquidated damages received for delay in installing sufficient plant	2,214 13 10	
		7,531 18 7
		£165,575 8 1

Dr. APPROPRIATION ACCOUNT. Cr.

Dr.			
To Net Expenditure on Capital Account for Year—			
Annuity in respect of undermining rights leased from Government …		£1,632 0 0	
Less Equipment— Plant sold … .. … … … .. …		1,216 18 3	
			£415 1 9
,, Government Taxes— Union of S.A.—			
Tax on profits … …	£13,568 14 0		
Special War Levy, estimated amount due for the twelve months ending 31st March, 1916 . . …	7,000 0 0		
Income Tax … … …	263 13 9		
		20,832 7 9	
English Income Tax … … … …		247 10 5	
			21,079 18 2
,, Dividend Account—			
Interim Dividend No. 21 of 8¾ per cent., declared 12th December, 1914 … … … … … … … … …		72,434 6 9	
Interim Dividend No. 22 of 5 per cent., declared 15th June, 1915		41,391 1 0	
			113,825 7 9
,, Balance Unappropriated— Carried to Balance Sheet … … …			112,894 17 0
			£248,215 4 8

Cr.	
By Balance Unappropriated— As per Balance Sheet, 30th June, 1914… …	£96,568 14 3
,, Balance of Working Expenditure and Revenue Account— For the year ending 30th June, 1915 … … …	161,625 14 6
,, Forfeited Dividends Account— Dividends unclaimed for a period of five years, forfeited in terms of Clause 127 of the Articles of Association … … … … … … … … ……	20 15 11
	£248,215 4 8

RAND MINES, LTD., Secretaries.

S. C. STEIL, Joint Secretary.

H. C. BOYD, Chairman.
S. C. BLACK, Director.

C. L. ANDERSSON & CO.,
J. N. WEBB,
(Incorporated Accountants), Auditors.

Johannesburg, 19th August, 1915.

NEW MODDERFONTEIN GOLD MINING COMPANY, LTD.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Eighteenth Ordinary General Meeting of Shareholders for the year ended 30th June, 1915, will be held in the Board Room, The Corner House, Johannesburg, **on Wednesday, 24th November, 1915, at 11 a.m.,** for the following business:—

1. To receive and consider the Balance Sheet and Accounts for the year ended 30th June, 1915, and the Reports of the Directors and Auditors.
2. To elect Directors in the place of those retiring in accordance with the provisions of the Company's Articles of Association.
3. To determine the remuneration of the Auditors for the past Audit and to appoint Auditors for the ensuing year.
4. To transact any other business which may be transacted at an Ordinary General Meeting, or which is brought under consideration by the Report of the Directors.

The Share Transfer Books of the Company will be closed from the 24th November, 1915, to the 30th November, 1915, both days inclusive.

Holders of Share Warrants who desire to be present or represented at the Meeting shall produce their Share Warrants (or may at their option deposit same), at the places and within the times following:—

(a) At the Head Office of the Company in Johannesburg, at least twenty-four hours before the time appointed for the holding of the Meeting;

(b) At the London Office of the Company, No. 1, London Wall Buildings, London, E.C., at least thirty days before the date appointed for the holding of the Meeting;

(c) At the Office of the Credit Mobilier Francais, 30 and 32, Rue Taitbout, Paris, at least thirty days before the date appointed for the holding of the Meeting;

and shall otherwise comply with the "Conditions as to the issue of Share Warrants" now in force.

Upon such production or deposit a Certificate, with Proxy Form, will be issued under which such Share Warrant holders may attend the Meeting either in person or by proxy.

By Order of the Board,

RAND MINES, LTD., Secretaries.

S. C. STEIL, Joint Secretary.

Head Office: The Corner House,
Johannesburg, Transvaal,
30th September, 1915.

REPORT OF THE DIRECTORS

For the Year ended 30th June, 1915.

To be submitted at the Eighteenth Ordinary General Meeting of Shareholders convened for Wednesday, 24th November, 1915, at 11 a.m., in the Board Room, The Corner House, Johannesburg.

To the Shareholders,
NEW MODDERFONTEIN G.M. CO., LTD.

Gentlemen,—Your Directors beg to submit their Eighteenth Annual Report and Audited Accounts for the year ended 30th June, 1915, accompanied by reports of the Consulting Engineer and Manager.

PROPERTY.

No change has taken place during the year in the area of your mining property, which consists of 1,301.0771 mining claims, freehold of portion of farm Modderfontein No. 17, in extent 1,200 morgen, and 4 water-rights.

OPERATIONS.

The particulars of the results of last year's operations, the development accomplished, and the ore reserves and values are dealt with in the reports of the Consulting Engineer and Manager, to which your attention is directed.

The tonnage milled, profits earned and amount distributed in dividends each constitute a record in the history of the Company.

ACCOUNTS.

The working profit amounted to £683,450 9s. 4d., to which must be added £20,419 11s. 1d. in respect of interest, freehold revenue and liquidated damages received from the Rand Mines Power Supply Company, Limited, and £11,743 6s. 9d. deducted for expenditure in connection with donations and contributions under the Miners' Phthisis Act (Compensation Fund), leaving a balance of £692,126 13s. 8d. to be carried to Appropriation Account. This sum, with the balance of £230,114 3s. unappropriated at the commencement of the year, and £177 5s. 11d. in respect of dividends which have been unclaimed for five years, and are now forfeited for the benefit of the Company, gives a total of £922,418 2s. 7d., which has been dealt with as follows:—

Expended on Capital Account	£38,772	4	1
Government Taxes.	92,963	6	7
Dividends	437,500	0	0
	£569,235	10	8
Leaving a balance unappropriated, represented by cash and cash assets, less all liabilities	353,182	11	11
	£922,418	2	7

It will be seen that the whole of the Working Capital subscribed in April, 1910, has now been expended, and that future expenditure on Capital Account will have to be met out of profits.

A special War Levy on the Mining Industry of £500,000 has been made by the Union of South Africa in respect of its financial year ending 31st March, 1916. This tax, which will be distributed amongst Gold Mining Companies pro rata to the amount paid by them under the Mining Taxation Act, 1910, during the same period, cannot be accurately ascertained until all returns are made to the Government in this respect. Provision has been made in the Balance Sheet for the estimated assessment under the Act, amounting to £30,000, which sum has been charged to Appropriation Account in the Accounts now submitted.

The amount of the tax is payable as regards 50 per cent. thereof on or before 31st December, 1915, and the balance by 31st March, 1916.

The total amount expended on development during the year amounted to £61,421 10s. 10d., of which £30,846 10s. 10d. have been charged to Capital Account for development and £30,575 to working costs. This latter sum is based on a charge of one shilling per ton milled and fully covers the cost of development in respect of the tonnage mined.

DIVIDENDS.

Two Interim Dividends, Nos. 17 of 15 per cent., and 18 of 16¼ per cent., absorbing £437,500, have been declared during the year. Sums due to registered shareholders resident in enemy territories were paid over to the Bank of England for the credit of the Public Trustee in accordance with the official direction of the Custodian, in terms of the Trading with the Enemy Amendment Act, 1914 (England.)

DIRECTORS.

Mr. S. C. Black and Mr. C. S. Goldman retire from the Board in accordance with the Articles of Association, but are eligible, and offer themselves for re-election.

Mr. L. Wagner has been appointed a member of the London Committee, vice Mr. C. Rube, deceased, and Mr. Francke, who was appointed to fill the vacancy caused by the death of Mr. Hoskier, has resigned, Mr. J. L. Siddall being appointed in his place.

AUDITORS.

You are requested to determine the remuneration of the Auditors for the past audit, and to appoint Auditors for the ensuing year.

New Modderfontein Gold Mining Company, Limited—continued.

GENERAL.

The results for the period covered by this report have been affected by the European War, a Rebellion in the Union of South Africa, and by the raising of a military force for the conquest and occupation of German South-West Africa. In common with other large employers of labour, your Company allowed half-pay to married men in its service who enrolled for military duty, and assisted the dependents of single men. The same allowances have been extended to men who volunteer for active service with the Oversea Contingent being raised. The War has also been responsible for advances in prices of general mining supplies.

It will be noticed that the value of stores on hand has considerably increased. This is due to the laying in of large stocks of stores which are essential to the continuation of mining and milling operations.

The gold produced is being realised under arrangements made with the Bank of England.

Throughout the year letters have been received from shareholders suggesting that the share of the Company be split into smaller denominations as a matter of convenience; the matter has not been lost sight of by your Board.

The subject of increasing the crushing capacity by the erection, in the neighbourhood of the Circular Shaft, of a reduction plant capable of dealing with 40,000 tons per month, has received the attention of your Board. Tenders for the necessary plant were called for, and in August, 1915, your Directors, after careful consideration, decided to proceed with the work, which will not be completed probably for about two years.

E. A. WALLERS, Chairman.

J. H. RYAN,
J. ANDREW COHEN,
A. G. GILL,
S. C. BLACK,
W. T. GRAHAM,
F. RALEIGH,
} Directors.

RAND MINES, LTD., Secretaries.

S. C. STEIL, Joint Secretary.

Johannesburg, 24th August, 1915.

CONSULTING ENGINEER'S REPORT.

The Chairman and Directors,

NEW MODDERFONTEIN G.M. CO., LTD.

Gentlemen,—The main features of the year's operations, compared with the previous two years, show satisfactory improvement, as follows:—

	Year ending June 30, 1913.	Year ending June 30, 1914.	Year ending June 30, 1915.
Tons milled	565,400	510,300	611,500
Yield per ton milled ...	39s. 7d.	38s. 10d.	38s. 3d.
Costs per ton milled ...	19s. 11d.	16s. 11d.	15s. 11d.
Profit realised	£559,243	£559,487	£683,451

The reduction plant has been operated to practically its full capacity throughout the year, with the result that the profit obtained has shown a notable advance over any previous year.

The satisfactory yield has been obtained from a mine grade lower than in the past year, closer attention to the elimination of waste rock, referred to in my last report, having had a beneficial effect on the value of ore sent to the mill.

The increased scale of operations has acted in favour of working costs, though it has to some extent been counterbalanced by the effects of closer sorting, expenditure on renovations to the stamp mill, and to the higher cost of stores and material brought about by war conditions.

The total development footage accomplished amounted to 18,142 feet; of this, 8,780 feet can be regarded as special development for the section commanded by the Circular Shaft, i.e., from the 11th level downwards. The reef disclosures have been on the whole all that could be expected, as good results are not looked for in the zone immediately east and west of the line of No. 12 Incline Shaft, where a comparatively narrow and poor zone has hitherto invariably been encountered. There has been a distinct improvement shown as the drives have been extended and approach zones in whose neighbourhood good results have hitherto been obtained.

The payable ore reserve, excluding all ore partially blocked out below the 10th level (Circular and No. 12 Shafts), after re-valuation and re-measurement, is as follows:—

	Block Ore.		Shaft and Boundary Pillars.		Total.	
	Tons.	Value. Dwts.	Tons.	Value. Dwts.	Tons.	Value. Dwts.
Main Reef... ...	5.606,000	8.24	281,800	7.46	5,887,800	8.20
South Reef ...	113,000	5.80	10,000	6.70	123,000	5.87
Ttls. & averages	5.719,000	8.20	291,800	7.44	6.010,800	8.15

The above figures are based on stoping widths averaging 62.5 inches in the Main Reef and 58 inches in the South Reef.

Compared with last year, the value of the block ore is 0.2 dwt. lower, due to the closer valuation of several large blocks in No. 12 Shaft section, which have, during the year, been more completely developed by winze and raise connections.

The tonnage of ore in reserve is also shown at a slightly smaller figure than last year. This is explained by the fact that last year some ore partially blocked out in the Circular Shaft section was included in the ore reserves and has this year been excluded. It is considered that on the whole the development at the Circular Shaft requires further detail work to provide additional information; until this is completed in cannot be valued with any degree of accuracy. The work planned for the current year will provide the data required.

The tonnage of ore partially developed in the Circular Shaft section totals just over one million tons.

Apart from the linear development on reef, a large amount of work has been done in connection with the permanent underground arrangements.

In the upper section of the mine, which for many years will be the ore producer for the existing reduction plant, many improvements have been taken in hand. The most important has been the completion of the haulage arrangements on the 8th or main level, which has made it possible to economically transport ore from the extreme eastern and richer section of the mine.

The steps that have been taken to enlarge the capacity of the mine have been as follows: On the surface, at the head of the Circular Shaft, the steel headgear is practically finished, a substantial engine room has been completed, one compressor erected, together with the electrical portion of the large hoisting engine. The transformer house and the general surface arrangements to the doors of the proposed reduction plant are, with the exceptions of minor details, all in readiness.

Underground, as already stated, large areas have been partially developed, and during the current year a number of additional stope faces will be available for working. At the shaft bottom an underground crusher station has been built; excavations for the main pumping plant, pump room, sumps and clarifiers are well in hand.

The capital expenditure for the past year has been heavy, and is scheduled in detail in the Manager's report. It has been spent mainly on advance development and general equipment at the new shaft. It is estimated that during the current year a further £55,000 will be expended on development, and £75,000 to complete construction work voted and already in hand. Of this latter sum roughly £11,000, expended on air power plant, will be recovered from the Power Company, the reimbursements being spread over a period of years. Apart from this, additional accommodation will be required for married employees, new central offices are recommended, and the artificial ventilation of the mine workings will require attention in the near future.

Reviewing the position generally, the mine is again in a stronger position after the year's work. It is hoped by means of further technical improvements to render the plant already existing capable of maintaining the present profits with comparative ease. During the year to come very considerable addition will be made to the ore reserve, which will then be still more capable of supplying the requirements of a much larger reduction plant.

The average number of natives employed for the year was 2,900, the supply improving gradually from the beginning of the year onwards.

The Manager and Staff deserve congratulation on the marked improvement shown on the year's work.

Yours faithfully,

HY. STUART MARTIN,
Consulting Engineer.

Johannesburg, 14th August, 1915.

New Modderfontein Gold Mining Company, Limited—continued.

Dr. BALANCE SHEET, 30th JUNE, 1915. Cr.

Dr.			
To Capital Account— Authorised— 350,000 shares of £4 each			£1,400,000 0 0
Note.—Of the above 350,000 shares, 42 shares have yet to be issued in respect of shares unconverted by Shareholders of the Modderfontein Gold Mining Co., Ltd.			
„ Share Premium Account— As per Balance Sheet, 30th June, 1914...			610,021 14 5
„ Funds Transferred from Appropriation Account— For Expenditure on Property, Development and Equipment in excess of Working Capital provided—			
As per Balance Sheet, June 1914		£277,961 9 10	
For the year ending June 30, 1915		38,772 4 1	
			316,733 13 11
„ Union of South Africa "Annuity Account"— For total amount payable (in 20 annual instalments of £17,310 each) as consideration for grant of undermining rights of Water-rights Nos. 456 7, as per contra		346,200 0 0	
Less Annuities paid to 31st March, 1915, and proportion provided for period from that date to 30th June, 1915		90,877 10 0	
			255,322 10 0
			2,612,077 18 4
„ Sundry Shareholders— Unpaid and unclaimed dividends		237,194 16 4	
„ Sundry Creditors— Wages, stores, etc.	53,490 18 4		
Union of South Africa—Tax on Profits, etc., £60,540; Special War Levy (estimated) £30,000 ..	90,540 0 0		
		144,030 18 4	
			381,225 14 8
„ Balance of Appropriation Account— Unappropriated			353,182 11 11
Note.—There are further liabilities as under:—			
I.—On account of shares subscribed for in other Companies			
Co-operative Exchange Yard, Ltd.— £64 per share uncalled on 68 shares		£4,352 0 0	
Witwatersrand Co-operative Smelting Works, Ltd.— 12s. per share uncalled on 1,504 shares		902 8 0	
W.N.L.A. Assoction, Ltd.— 8s. per share uncalled on 1,164 shares		465 12 0	
		£5,720 0 0	
II.—Native Recruiting Corporation, Ltd., Deposit Account, 12s 6d. per Native uncalled on complement of 4,102 natives.			
III.—For contracts open for the supply of additional equipment, etc.			
Carried forward			£3,346,486 4 11

Cr.				
By Property—		Mining Claims.		
Mynpacht No. 292 of 120 morgen, equal to ...		172.8000		
Prospectors' and Diggers' claims		1,079.3056		
4 Water rights.			£835,228 4 0	
Freehold over portion of Farm Modderfontein No. 17, in extent 1,200 morgen				
Mining rights under Water-rights, Nos. 456-7, held under grant from the Government of the Union of S.A. Extent		48.9715		
			£346,200 0 0	
As per Balance Sheet at June 30, 1914		1,301.0771		£1,181,428 4 0
„ Mine Development and Equipment— Circular Shaft Sinking and Equipment:— As per Balance Sheet, June 30, 1914		£128,403 8 5		
Equipment— For the year ending 30th June, 1915 . .	£46,304 19 2	46,304 19 2		
			174,708 7 7	
Development— As per balance Sheet 30th June, 1914 . .		284,760 2 9		
For the year ending 30th June, 1915 . . .	30,846 10 10	30,846 10 10		
			315,606 13 7	
Equipment— As per balance Sheet 30th June, 1914 . . .		927,776 7 4		
For the year ending 30th June, 1915 . . .	12,558 5 10	12,558 5 10		
			940,334 13 2	
As per Manager's Report .	£89,709 15 10			1,430,649 14 4
				2,612,077 18 4
„ Shares in Other Companies at cost—				
Co-operative Exchange Yard, Ltd.— 68 £80 shares, £16 per share paid... ..		£1,088 0 0		
Rand Mutual Assurance Co., Ltd.— 247 £10 shares, fully paid... . ..		2,470 0 0		
Witwatersrand Co-operative Smelting Works, Ltd.— 1,504 £1 shares, 8s. per share paid... ...		601 12 0		
W.N.L.A., Ltd.— 1,164 £1 shares, 12s. per share paid... ...		698 8 0		
Native Recruiting Corporation, Ltd.— 39 £1 shares, fully paid		39 0 0		
			4,897 0 0	
„ Stores and Materials— in stock		£37,460 6 11		
Cyanide Shipments detained in Foreign Ports		800 8 11		
		38,260 15 10		
„ Live Stock, Vehicles, etc....		1,141 4 9		
„ Furniture		644 15 0		
„ Plantations		1,948 13 10		
			41,995 9 5	
Carried forward			£46,892 9 5	£2,612,077 18 4

New Modderfontein Gold Mining Company, Limited—continued.

Dr. BALANCE SHEET, 30th JUNE, 1915.—continued. Cr.

Dr.	£ s. d.
Brought forward	£3,346,486 4 11
	£3,346,486 4 11

Cr.	£ s. d.	£ s. d.	£ s. d.
Brought forward		£46,892 9 5	£2,612,077 18 4
By Sundry Debtors and Payments in Advance		15,632 10 0	
,, Rand Mines Power Supply Co., Ltd., Compressor Account— Cost of Air Compressor Plant	61,512 0 3		
Less Amounts paid and redeemable to date	7,726 13 1		
		53,785 7 2	
		116,310 6 7	
,, Deposits—Fixed and on Call, bearing interest	524,851 12 11		
,, Cash at Bankers	8,529 2 1		
,, Gold Consignment Account...	84,717 5 0		
		618,098 0 0	
			734,408 6 7
			£3,346,486 4 11

Dr. APPROPRIATION ACCOUNT. Cr.

Dr.	£ s. d.	£ s. d.	£ s. d.
To Net Expenditure on Capital Account for Year—			
Development and Equipment	£89,709 15 10		
Less Balance of Working Capital on hand at 30th June, 1914	68,247 11 9		
		£21,462 4 1	
Annuity in respect of undermining rights of Water-rights, Nos. 456 7		17,310 0 0	
			£38,772 4 1
,, Government Taxes— Union of South Africa—			
Tax on Profits... ...	60,540 4 0		
Special War Levy, estimated amount due for the 12 months ending 31st March, 1916	30,000 0 0		
Income Tax	695 4 1		
		91,235 8 1	
English Income Tax		1,727 18 6	
			92,963 6 7
,, Dividend Account—			
Interim Dividend No. 17 of 15 per cent., declared December 12, 1914		210,000 0 0	
Interim Dividend No. 18 of 16¼ per cent., declared June 15, 1915		227,500 0 0	
			437,500 0 0
,, Balance Unappropriated— Carried to Balance Sheet			353,182 11 11
			£922,418 2 7

Cr.	£ s. d.	£ s. d.
By Balance Unappropriated— As per Balance Sheet, June 30, 1914		£230,114 3 0
,, Balance of Working Expenditure and Revenue Account— For the year ending June 30, 1915	£692,126 13 8	
,, Forfeited Dividends Account— Dividends unclaimed for a period of five years, forfeited in terms of Clause 127 of the Articles of Association	177 5 11	
		692,303 19 7
		£922,418 2 7

RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

E. A. WALLERS, Chairman.
S. C. BLACK, Director.

To the Shareholders,

NEW MODDERFONTEIN G.M. CO., LTD.

We have audited the Balance Sheet of the New Modderfontein Gold Mining Company, Limited, dated the 30th June, 1915, above set forth, and have obtained all the information we have required. In our opinion, such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs, according to the best of our information and the explanations given us and as shown by the Books of the Company.

C. L. ANDERSSON & CO.,
Incorporated Accountants.
DELOITTE, PLENDER, GRIFFITHS, ANNAN & CO.,
Chartered Accountants, Auditors.

Johannesburg, 31st August, 1915.

New Modderfontein Gold Mining Company, Limited—continued.

Dr. Working Expenditure and Revenue Account for the Year ending 30th June, 1915. Cr.

To Working Expenditure at Mine—(Vide Manager's Report) … … …		£466,355 3 9	
,, General Expenses—Head Office—			
Salaries, agency fees and rent … … …	£8,692 2 8		
Stationery, printing, advertising, postages and telegrams… … … …	1,234 13 9		
Directors' and Auditors' Fees … … …	2,798 15 6		
Licences … … .. …	6,129 15 0		
Sundry general expenses .. … … …	1,030 18 1		
		19,886 5 0	£486,241 8 9
,, Credit Balance on Working for the year carried down … … … … ..			683,450 9 4
			£1,169,691 18 1

By Gold Account … .	£1,169,691 18 1
	£1,169,691 18 1

To Donations and Contributions to War Relief Funds, etc. … … … … …	£2,410 9 10	
,, Miners' Phthisis Act—Assessment under Miners' Phthisis Act, 1912, in respect of Compensation Fund… … … … … … …	9,332 16 11	£11,743 6 9
,, Credit Balance carried to Appropriation Account … … … … …		692,126 13 8
		£703,870 0 5

By Balance brought down … … … … …		£683,450 9 4
,, Interest and Exchange… … … …	£14,306 6 3	
,, Freehold Revenue, etc. … … …	3,528 19 8	
,, Rand Mines Power Supply Co., Ltd.—Liquidated damages received for delay in installing sufficient plant … … … … … … … …	2,584 5 2	20,419 11 1
		£703,870 0 5

RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

Johannesburg, 31st August, 1915.

E. A. WALLERS, Chairman.
S. C. BLACK, Director.
C. L. ANDERSSON & CO.,
Incorporated Accountants,
DELOITTE, PLENDER, GRIFFITHS, ANNAN & CO.,
Chartered Accountants, Auditors.

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CONTENTS.

PAGE
Notes and News ... 125
Topics of the Week:
Science and the War ... 127
Inventors and Patent Law Reform ... 128
How to Promote Industrial Peace ... 128
Mining in the Murchison Range District ... 129
The Water Supply of the Rand—IX. ... 131
The Year with the Consolidated Main Reef ... 132
The September Output: Group Returns ... 133
Diamond Cutting: The Financial Aspect ... 134
Correspondence and Discussion: "S.A. Association of Analytical Chemists" ... 135
Stoping Methods and Drilling Problems on the Witwatersrand—III. ... 136
Rhodesian Section:
Latest Mining News ... 137
Mine Safety, Sanitation, and Welfare Bulletin:
Mine Managers' Views of Safety in Mining ... 140
The Week in the Mining Material and Engineering Trades ... 141
Engineering Notes and News:
The Trend of Electrical Development—II. ... 143

Notes and News.

Mr. B. Oppenheimer's Offer to South Africans.

A recent cable stated that "Mr. B. Oppenheimer, an Anglo-African, offers a gift of £100 to each of the first four South Africans to gain the Victoria Cross, and £50 to the first four to receive the Distinguished Service Order." The announcement has naturally created considerable interest in Kimberley, where Mr. Bernard Oppenheimer (who is the eldest brother of Mr. E. Oppenheimer) is well known, having in former years been the representative in Kimberley of Dunkels and Co., members of the Diamond Syndicate. Mr. B. Oppenheimer is now head of the diamond department of Messrs. Lewis and Marks in London.

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Army Commissions for Mine Officials.

For some time past quite a number of mine officials have been quietly and unostentatiously leaving the Rand for Europe, some with the intention of assisting with the production of munitions, but mostly with a view to seeing some active service on the western battle front. There is little doubt that quite a large percentage would volunteer for active service were it not that our gold production is such a potent factor in the war, and that the mines must be kept running, and therefore can ill afford to allow many of their officials to leave. From a number of cases which have come to our notice it would appear that holders of managers' certificates find little difficulty in securing commissions, the authorities apparently recognising that their professional training well adapts them for the new style of warfare.

* * * *

Metals Consumed in Shell Manufacture.

The demands of manufacturers of shrapnel and other shells and rifle cartridges constitute an important item in the consumption of copper, spelter, and other metals. The metals needed to execute the war orders already placed are estimated at over 10 per cent. of last year's copper production of the United States, about 7 per cent. of the spelter production, and nearly 20 per cent. of the lead production. A British 18-pounder, or 3·3-in. shrapnel, requires 5 lbs. 9⅛ oz. of brass, containing 66 to 70 per cent. Cu, or nearly 3¾ lbs. A small copper band around the shell adds 4¾ oz., making the total copper 4·04 lbs. Spelter consumption per shell of this size is about 1·87 lbs. Lead bullets weighing 7·92 lbs., and composed of 7 parts Pb to 1 Sb, constitute the metal load of the projectile. Estimating the total orders for shrapnel and other shells placed in the United States by Europe at 25,000,000 shells, these orders would call for a total of 101,000,000 lbs. of copper, 46,750,000 lbs. of spelter, and 173,250,000 lbs. of lead. Actually the metal consumption is larger, as a fair proportion of the shells are 4·7-in. howitzer shells, using more brass; some 6-in., 7½-in., and probably 9-in. shells are also being made. Rifle cartridges are composed mainly of copper, there being 1 lb. of it used in making 24 Lebel cartridges, a type widely used by the French Army. Every 125 of these cartridges consume 1 lb. of spelter and a small amount of nickel. Steel consumption per shell varies more widely with the different types. A finished 3·3-in. shell contains 6 lbs. 15¼ oz. of steel, the steel shell weighing 6 lbs. 5¾ oz., and the diaphragm 9½ oz. If the shell is made from a steel bar, the weight of this is about 17 lbs., while a forging for the same purpose weighs approximately 14½ lbs., and a "bottle" made by the seamless tube process somewhat less.

* * * *

Diamonds from China.

It will be news to many in South Africa that diamonds are now being found in Southern Shantung, China, where there is said to be a very extensive diamond field near Ichoufu. The diamonds are only of value for commercial purposes, such as glass cutters, etc., but the peculiar thing about this field is that no one seems to know precisely where the diamonds came from. Although the

Germans did a considerable amount of prospecting work, says the *B. and S.A. Export Gazette*, they never found the stones in payable quantities, and since the downfall of Tsingtau they have abandoned the field. Nevertheless, diamonds in considerable quantities continue to find their way to the late German stronghold, now in Japan's hands, although it is known that the natives do not carry on regular mining operations. The Chinese refuse to divulge whence they receive their supplies, their only explanation being that farmers, when ploughing, find the diamonds stuck in their straw shoes. Would it not pay some diamond expert in South Africa to visit the field? It lies between the narrow strip of territory of the Yiho and Shai rivers, and the German theory is that when the two rivers were connected, the stones were deposited in their present position by the action of the water, and have been swept down from the Mengshan Mountains, where diamonds of excellent quality are constantly being picked up. This suggestion may be carried into effect, if not now, after the war, for at present diamonds are, as everybody knows, a drug in the market.

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Engineering Standards.

In his presidential address to the engineering section of the British Association, Prof. Hele Shaw showed that the Standards Engineering Committee during the last ten years had done a work which was quite equal to that in any other country of completing standardisation of all important matters in engineering, and, moreover, had secured the recognition of these standards in all public contracts. "As giving some indication of the range of this work," he said, "it may be said that there are more than sixty committees for dealing with every conceivable engineering matter, from bridges, ships and locomotives down to electric lamps. One of the last of these committees dealing with the automobiles, has eleven sub-committees, many of which have already completed their work. It is almost impossible to do justice to the extraordinary achievement of bringing order out of what was apparently hopeless chaos and to the benefit of the British engineering industry of this work, largely due to the energetic secretary, Mr. Leslie Robertson. We may justly pride ourselves that this section was a pioneer of standardisation by taking up the subject of small screws, its work being taken over ultimately by the Standardisation Committee. There is yet work to be done, however, and one matter of great importance would be to get a universal standard of temperature for instruments of measurement other than zero. A temperature, for instance, of about 62 deg. Fah. would make steel rods measures more practically workable than at present."

* * * *

United Jack.

At the beginning of last week an interesting function took place at the United Jack Company's mine on the Murchison Range, when the new plant of the company was officially started in the presence of the Chairman, Mr. John Jack, Sir Thomas Price, Sir Thomas Hyslop, Mr. T. S. McEwen, S.A. Railway Commissioners, with Mr. W. W. Hoy, the General Manager, Mr. Warington-Smythe, Secretary to the Mines Department, and a number of visitors from Pretoria. The event was, moreover, one of considerable importance to the gold mining industry of the district, where the linking up of the railway line between Komati Poort, on the Delagoa Bay line, and Zoekmakaar, on the Messina-Pietersburg extension, has raised new interest in a line of country which was at one time the centre of a good deal of activity. The difficulties of transport have usually been described as the cause of the decay of mining along the Murchison Range and the adjacent low country, and to a large extent this is no doubt true. Other obstacles have been the uncertainties associated with reef mining as compared with the unique facilities afforded by the comparatively uniform grade of the Rand bankets, and their suitability for exploitation upon a large scale. The antimony problem of the Murchison Range, however, has had a great deal to do with the want of enterprise during recent years in that neighbourhood, for the unquestionably rich gold contents of the ore along parts of the so-called Antimony Line have proved extremely refractory and expensive to treat, by reason of the baser ore which is intimately mixed with them. The discovery by Messrs. McArthur, Forrest and Co., of Glasgow, of a simple and, it is claimed, a reasonably cheap process of dealing with the antimony, has attracted a great deal of attention, and the practical application of the new method at the United Jack mine is expected to provide the long-sought-for solution of the metallurgical puzzle.

* * * *

The Caustic Soda Process.

The dissolving out of the antimony sulphide, or stibnite, from the crushed auriferous ore by means of a heated solution of caustic soda, and its recovery as a clean saleable product, together with the separate treatment of the leached sands in order to obtain the gold is, in brief, an outline of the McArthur Forrest process. It is carried out at the United Jack as follows: The ore from the mine is first of all delivered to two No. 7 Ball mills, manufactured by Johnson, of Leeds, and is crushed to a 30-mesh. Thence it is discharged to bins, and conveyed as required to circular dissolving tanks, of which there are six, the dimensions being 23ft. 9in. diameter, and 8ft. depth. There the prepared caustic soda solution is pumped upon the sands and drawn through them in pretty much the same way that solutions of cyanide are applied upon the Rand. The resultant solution, carrying the antimony sulphide chemically combined, is drained off to three carbonators, where it is treated with carbonic acid gases from a lime kiln. The antimony is precipitated in an amorphous sulphide, and the sludge is pumped to the ordinary type of filter press and pressed into cakes, which are finally dried and made ready for the market. The solution from the filter press goes back to stock vats for use over again. The sand residue is treated in the usual way by cyanide solution, which goes through zinc precipitation boxes for the recovery of the gold. A large quantity of ore is already developed in the mine, and Mr. W. T. Pope, who is managing the undertaking, averages his rock at from 7 to 8 dwts. of gold and about 12½ per cent. of antimony sulphide. The company own some four miles of reef along the antimony line, where excellent values have been known to exist for many years past. If the McArthur Forrest process, which is in the hands of Mr. Galbraith, should prove successful, considerable impetus will be given to mining in that part of the low country. The cheaper transport and general facilities which are now available have greatly altered the conditions of the neighbourhood, and there are signs that capital is again tending in that direction.

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The Harmony Block.

For many years the affairs of the Harmony Proprietary Co., Ltd., have had a brief annual record in the *Mining Manual*, *M.O.A.*, and similar publications, but apart from this the doings of the company have attracted little attention, for the reason that practically nothing has been done. The Harmony Estate comprises some 26 farms in one block, with an area of about 300 square miles in the vicinity of Leydsdorp. Lying as they do below and adjacent to the Drakensberg, the farms contain some of the finest agricultural and pastoral land in the Transvaal. Their mineral prospects, also, are by no means inconsiderable, although with the exception of the Sutherland Reef property no workings of any size have ever been undertaken upon them. A good deal of spasmodic prospecting has been done in the past on the schistose zone of the Murchison Range, which traverses the northern section of the area held by the company, but the difficulties of transport and living generally which have retarded the exploitation of the district have stood in the way of the various undertakings which have been either proposed or begun upon the Harmony Estate. With changed conditions, however, a new era seems to be beginning for this venture as for others around Leydsdorp. The mineral interests of the Estate have been separated from the purely agricultural possibilities, and a new company called the Harmony Estate (Transvaal) Development Co., Ltd. (known in London by its alternative name of Harmony

Development), has been formed with a capital of £60,000 to deal with the mineral rights of the property. Of this amount £50,000 is represented by cash shares and £10,000 in shares are held by the parent company, who retain all the surface rights. The Chairman of the new venture, Mr. J. R. Mitchell, is at present in the Leydsdorp district on behalf of his board, and active work, we understand, is contemplated at any early date. Various schemes are being considered with regard to the block, among them a ranching venture.

* * * *

Robinson Deep Scheme.

The much-talked-of scheme of amalgamation between the Robinson Deep and the Booysens Estate is at last about to be brought to fruition. As stated in the circular accompanying the notice calling the necessary special general meetings, " the directors have for some years past endeavoured to arrive at an agreement with the Booysens Estate and South Deeps Companies, with a view to acquiring additional claim area, in order to secure a longer life for this company, but owing to considerable difference of opinion between the respective engineers as to the value of the Booysens and South Deeps Companies' claims and to other points of divergence, it proved impossible to come to terms." The Robinson Deep is not to lose its identity, for the new company will retain the title. The financial provisions of the scheme are somewhat novel, and also rather complicated, but, so far as can be seen, the matter seems to work out to the advantage of Robinson Deep holders. This company receives for the whole of its assets, except sufficient to pay a dividend at the rate of 20 per cent. for the period beginning on July 1 last and ending on the day preceding the date of incorporation of the new company, 500,000 " A " shares of 1s. each. The new company will have a capital of £925,000, divided into 500,000 " A " shares of 1s. each and 900,000 " B " shares of £1 each. So far as Robinson Deep holders are concerned, they need not worry themselves about market fluctuations in the price, for, according to the provisions of the scheme, " the ' A ' shares shall have the right to have distributed among them rateably, as and by way of fixed cumulative preferential dividends: A sum at the rate of £200,000 per annum from the incorporation of the new company to the end of the year 1919; a sum at the rate of £75,000 per annum from January 1, 1920, to the end of the year 1936; a sum at the rate of £62,500 per annum for the year 1937; a sum at the rate of £37,500 per annum for the years 1938 and 1939; and a sum at the rate of £12,500 per annum for the year 1940, and thereafter until the capital on the ' A ' shares has been paid off a sum equivalent to interest at the rate of 5 per cent. per annum on such capital." There is little difference in the basis upon which the Booysens Estate and South Deeps come in under the new arrangement, the Booysens receiving rather more shares per claim than South Deeps. The scheme is to be welcomed if only because it will enable a large and hitherto undeveloped area to be brought within sight of the profit-earning stage. The Robinson Deep, of course, continues its own working, and can most conveniently tackle the Booysens and South Deeps claims, for the property has a good shape for working, and what is of interest is the fact that the Village Deep to the east of the South Deeps property is opening up a capital grade of ore. This naturally gives confidence to the directors to develop this area, and seeing that it can be advantageously worked from the Robinson Deep, very heavy capital outlays are thereby avoided. So far as finance is concerned, should any further capital be required, the new company has the right for a period of seven years to call upon the Gold Fields and the Central Mining in equal proportions for a loan not exceeding in all £300,000 at a rate of 6½ per cent. In consideration of this, these two undertakings will each have an option for seven years from the incorporation of the new company to subscribe for 50,000 " B " shares in amounts of not less than 5,000 shares at any one time, and all money received in respect of such subscriptions will be utilised in the reduction of the indebtedness of the new company.

TOPICS OF THE WEEK.

SCIENCE AND THE WAR.

Naturally the war bulked largely in the addresses and papers read before the annual meeting of the British Association in mail week. Nothing could have been more appropriate to the occasion than Professor Schuster's presidential address, to which he gave the title, " The Common Aims of Science and Humanity." Professor Schuster warned us that the utilitarian drum can be beaten too loudly. In seeking for a remedy for our commercial failings, we fly to a comparison with Germany; and finding that country spending far more money than we do upon scientific organisation, we jump at once to the conclusion that this is where we are wanting. We overlook the point that Germany's commercial success is attributable to many factors, both honourable and dishonourable. Not only science, but also other aids have contributed, amongst which may be mentioned an unscrupulous disregard of the ordinary code of national morality, the misuse of trade marks, subsidies to steamships and other transport facilities, cartels, organised invasion by swarms of commercial travellers, and many other things calculated to contribute to the advantage of a country in pushing competitive trade. Professor Schuster even went so far as to imply that national success can be purchased at too great a price. He said: " Do we not find in the worship of national success the seed of the pernicious ambition which has maddened a nation and plunged Europe into war? " While not depreciating the claims of science as a necessary element in the success of commerce and manufacture, Professor Schuster points out that there are dangers in the tendency of modern utilitarian methods. The implied antithesis of scientific attainment and business methods he shows to be a fallacy. He believes that there is no foundation for the assertion that special gifts are necessarily associated with different occupations. When one man, he says, calls for the conduct of affairs on business lines and another clamours for scientific methods, they either want the same thing or they are talking nonsense. He does not even admit the validity of the prevailing self-depreciation of the British race in regard to their powers of organisation. It is absurd, he says, to think that a nation which has founded a great Empire, and is able successfully to carry on an enormous trade in every part of the world, could be devoid of the faculty of organisation. The Germans are not superior to us in organisation, but in co-operation and discipline; which are quite different things, and, however admirable qualities, not without danger when they lead a nation to ruin. " The cry for organisation," said the President, " justifiable, as it no doubt often is, resolves itself, therefore, into a cry for increased discipline, by which I do not mean the discipline enforced at the point of the bayonet, but that accepted by the individual who voluntarily subordinates his personal convictions to the will of a properly constituted authority. This discipline is not an inborn quality which belongs more to one nation than another; it is acquired by education and training. In an emergency, it is essential to success, but if it be made the guiding principle of a nation's activity, it carries dangers with it which are greater than the benefits conferred by the increased facility for advance in some directions." The lack of discipline—how prominent a feature is it in the recent history of the Empire! We have seen it in politics, in trade unions, in commercial circles—even during the war it has been exhibited, especially in the ranks of labour. It is fraught with danger to the State, which, we grieve to say, has fostered it by injudicious legislation in the past, and it has proved an obstacle to many a promising scheme for co-operation in trade and industry. The individual who will not subordinate his personal views to the decisions of authority, and stubbornly persists in following independent lines, is the wrecker of all such hopes. In no part of the British Empire is this lack of discipline more marked than in South Africa. When a correspondent in our last issue attributed to the bad ventilation of the mines the readiness of the men to embark at a moment's notice on a strike or a riot, he might more correctly have blamed the prevailing absence of discipline. Recent deplorable manifestations of ill-feeling in our midst must be set down to the same reprehensible failing, which fortunately the President of the British Association thinks may be corrected by training and education.

HOW TO PROMOTE INDUSTRIAL PEACE.

From the South African point of view, one of the most interesting papers read before the British Association at Manchester was that by Sir Charles W. Macara, Bart., on the relationship between Capital and Labour. The subject is one of supreme importance at any time, but more especially so at a time of national crisis, such as that through which we are at present passing. It may not be generally known that to Sir Charles Macara the credit is due for the formation of the Industrial Council. A perusal of the report of that body proves conclusively not only the desirability of, but the absolute necessity for, the thorough organisation of both capital and labour, and that where this obtains disputes are usually settled between the parties themselves. The main obstacle to the perfecting of these organisations is the selfishness of a small minority of both employers and workpeople, who remain outside the various organisations, but who do not hesitate to take full advantage of the public-spirited and self-sacrificing work of the majority. His own summary of the paper read by Sir Charles Macara is as follows: (1) That harmonious relationship between capital and labour is always of the utmost importance, and supremely so at a time of great national crisis. (2) That in order to cope with such a colossal task as that by which the Government was confronted, the task would have been lightened and much would have been gained had they at once enlisted the assistance of experienced industrial organisers, and co-ordinated all existing organisations. (3) That the United Kingdom is as well organised as any other nation, and had there been effective co-operation of the industrial, commercial, financial, scientific, transport, and labour interests with the Government from the commencement of the war, the position in every respect to-day would have been vastly better than it is. (4) That by the co-ordination of these interests, the problems connected with the supply of the necessaries of life, and with the undue raising of prices of commodities, might have been coped with much more successfully than they have been. (5) That the rise in the prices of commodities has undoubtedly been the main factor in creating industrial unrest. (6) That the only object in calling attention to the errors of the past is that we might profit by the experience gained, and so utilise to the utmost the vast resources at disposal. (7) That the interference by politicians with industrial disputes is to be strongly deprecated, often leading to inconclusive settlements, it being impossible for them to have the necessary knowledge of the intricacies of the different industries or their varied conditions of working; that such interference only engenders bitterness and does ultimate harm. (8) That thorough organisation of both capital and labour is essential to the smooth working of the industries, and that where this is the case, disputes are generally settled by negotiations between the parties themselves. (9) That disputes frequently arise from an exaggerated estimate of the return on capital, and that schemes for ascertaining this return should be promoted, as exaggerated views often lead to unreasonable demands. (10) That the Industrial Council, which was appointed by the Government in 1911, and which is composed of an equal representation of capital and labour, with a non-political chairman, has not been utilised since the outbreak of war, that no adequate explanation of this has been offered, and that the valuable report of its inquiry into industrial agreements has not been utilised. (11) That the enforcement of compulsory arbitration where large bodies of men are concerned is an impossibility, and that an inquiry into the merits of a dispute by experienced men representing capital and labour, and the publicity given to its findings, would, together with public opinion generally, supply the only effective compulsion. (12) That Trade-Union limitation of output is against the best interests of labour. (13) That official representatives of labour are generally men of capacity and fairness, deserving of the confidence of the rank and file. (14) That the effect of the war upon industries has been varied, and that any war bonus or wages advance should only be granted after full investigation by leaders of capital and labour. Several of these points apply equally to South African industrial problems, and provide a noteworthy addition to the literature of the relations between capital and labour.

INVENTORS AND PATENT LAW REFORM.

The unification of the patent laws of the four Provinces of the Union is one of the highly desirable reforms that has been relegated to the background by the pressure of legislation in the past few years. Some instructive light was thrown recently on the subject by Professor Hele Shaw, in his presidential address to the Engineering Section of the British Association. He showed that the subject of patent laws was well worthy of consideration, since progress in engineering, certainly on the mechanical and electrical sides, was largely dependent upon invention, which was not likely to be seriously undertaken without adequate protection, not entirely for the inventor, but also for those who really made the invention practical by means of capital and business support. "A great deal of nonsense is talked and written about inventors," said Professor Hele Shaw, "as if they were a special class of being, generally mad and always impossible. Some inventors are both, but the fact is most engineers spend their lives seeking new ideas and devising new methods of carrying them out—in short, in inventing. It is of the greatest importance that every step should be taken to encourage sound invention and to see that anything of value is secured for this country. Of course, every invention worth anything is immediately known in other countries, but I need not argue to this Section that the country which actually produces the inventions is at a great advantage quite apart from the royalties payable on foreign patents. The foundation of the Munitions Invention Panel is a step in the right direction and will doubtless be followed later on by Government Committees for peace inventions. Such Committees or Government Departments dealing with various industries will be assisted by suggestions from a body like this. Take, for instance, the present state of Colonial patents. Within the last few years one Commonwealth patent has been made to cover the whole of Australia, instead of there being, as of old, separate patents with different regulations and fees for each separate Colony. South Africa has not yet conferred a similar boon upon inventors, and we might do something to expedite this desirable innovation. But this touches the much wider question of Colonial Patent Laws as a whole. These are all different and differ from those of the Mother Country. It would be a splendid thing if we could bring about a conference leading to the unification of these diverse patent laws and have one comprehensive patent law for the whole Empire." Professor Hele Shaw mentioned many other matters; for instance, the question of extending the time of secrecy in the provisional patent. The "close" time in patents was the act of Chamberlain and is a splendid legacy of that great man, but for really many important patents the close time allowed is not enough. Another was one in which he said the German system had certain advantages, viz., in having two classes of patents. One of these is the patent "proper," which is only granted after the most severe search and criticism and holds the usual period when granted. The other is a secondary patent granted for the shorter term of five years, and is given for one of the hundred-and-one minor improvements and devices which, though of real value, only constitute small modifications in detail and not new applications of principle. There are other matters, such as the question of giving wider powers to the Comptroller to refuse a grant where novelty is less than microscopic. Here, again, the German system of demanding that some definite principle is applied *to produce some definitely new effect*, might to some extent be followed, especially in view of the constant accumulation of published devices, some patented and others not. It may be hoped that our cumbersome and antiquated patent laws will be one of the first matters to engage the attention and reforming zeal of the new Union Parliament.

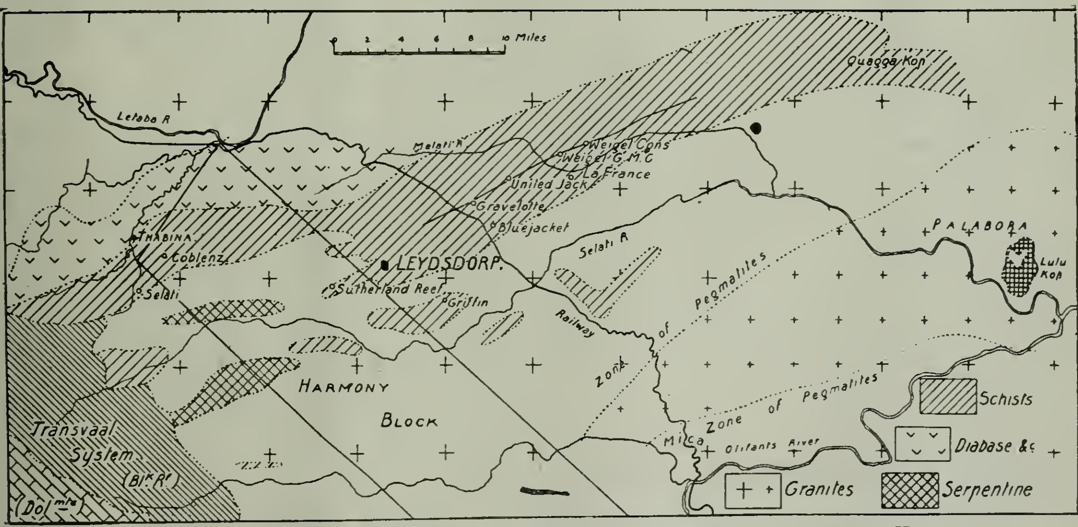
MINING PROSPECTS OF THE MURCHISON RANGE DISTRICT.

Opening of Railway Communication—Revived Interest in an Old Goldfield—The Geological Conditions.

The recent opening of the Zoekmakaar—Komati Poort railway across the low country, between the main line from Pietersburg to Messina on the one hand and the trunk line from Pretoria to Delagoa Bay upon the other, has thrown open, for mining and agricultural purposes, a vast region of the Transvaal which is comparatively unknown to any except a few old-time prospectors and an equally small group of hunters and traders. Of late years the fertility of the country below the Drakensberg, along the upper reaches of the Groot Letaba River, has attracted a few industrious agriculturists, and has led to the establishment of the Government farming estate at Tzaneen, adjacent to the new line of railway, but from the industrial and economic point of view the whole of the low-lying Zoutpansberg and Lydenburg territory which has now been provided with transport facilities by the Railway Department of the Union may be considered as altogether virgin soil. Years ago, before the Witwatersrand had tied to itself nearly all the available capital and engineering ability in the country, and when the outside districts were not suffering from the disadvantage of being considered "unfashionable," the Murchison Range and the other auriferous areas of the low country, east and north-east of Pietersburg, were the centres of a good deal of mining activity, and seemed to have in them the beginnings of a busy and prosperous future. Gradually, however, in spite of some sporadic successes in the Birthday district, and various encouraging and even glowing reports from the Leydsdorp neighbourhood, public interest in the field diminished to almost vanishing point, large blocks of claims were abandoned, the enthusiasm of the "fossicker" was quenched, and the gentle flow of financial aid from outside sources became reduced to the merest trickle. Amid the general desolation a few resolute men, refusing to become disheartened, have spent a considerable amount of time and money in the effort to overcome the difficulties of the country and to prove its value as a mining area under improved conditions of transport and living. Among these Mr. John Jack, of Pretoria, and his associates in the United Jack venture on the Murchison Range, are deserving of special mention. Having developed their mine in the face of many obstacles, and spent large sums in the endeavour to solve the auriferous antimony problem which has been the bugbear of the Range ever since its discovery, they have erected a metallurgical plant with a capacity of 50 tons per diem, in accordance with the advice and designs of Messrs. McArthur, Forrest & Co., of Glasgow, and have every hope of drawing an excellent revenue from both the antimony and gold contents of their ore. If the undertaking meets with success, one of the most formidable difficulties of that line of reef will have been obviated, and many miles of good ore-bearing ground will be brought within the list of industrial possibilities. The facilities for obtaining supplies and the more ready means of keeping in close touch with the markets and business centres of the Union will undoubtedly revolutionize the conditions of the "low country" over wide distances along the new line of railway, not alone with regard to mining but with respect to agriculture also.

A Revived Movement.

Whatever be the immediate result of such enterprises as those initiated at the United Jack, or at Mr. Weigel's mine further afield, where crude antimony by itself is being recovered from the ore by a process of liquation, interest in the district will assuredly revive, and in one way or another, no doubt, under experience and better methods will achieve success where earlier efforts have met with nothing but failure. Interest, as a matter of fact has already been resuscitated, if one may judge from the claim-pegging activity which has recently been in evidence. Large blocks, for instance, have been registered by Mr. Schneider, of Pretoria, on behalf of the Abe Bailey group; it is said that at least 2,000 claims have been thus acquired. Other distinctly new name plates, also, are to be seen in every direction, and there are probably few spaces, along the Murchison Range, at any rate, which are now available for the pegger. It must be remembered, of course, that the low country is not a new field, in the full sense of the term. It has been tried by influential mining houses and found unsuitable to their purposes, and even with the improved conditions of to-day, and those which will follow almost immediately, it is quite certain that mining, as carried out upon the



Geological Sketch Map of the Murchison Range District (after A. L. Hall).

Witwatersrand, cannot be applied below the Drakensberg, any more than it can be attempted in the Barberton district or Rhodesia.

In the concluding part of his report upon "The Geology of the Murchison Range and District," Mr. A. L. Hall, of the Mines Department, makes the following remarks with reference to the economic prospects of the neighbourhood: "As regards the economic position of the district, it is specially suited for small enterprises, either for companies with a modest capital or for energetic individuals. Owing to the very uncertain nature of several of the lenticular and other reefs, the patchy and erratic distribution of pay values, and the inherent geological difficulties of prospecting, there is not much room along the Murchison Range for larger enterprises, planned on a more ambitious scale. . . . . The fundamental drawback of no efficient transport, which during so many years has dragged back the wheel of industrial progress, is now permanently and effectively disposed of and there is little doubt that several previously dormant propositions—probably both the promising as well as the doubtful ones—will share in the industrial revival which may reasonably be expected to follow on the completion of the Selati Railway. Incidentally, this opening up of the country will have the highly beneficial effect of keeping the local population no longer in comparative isolation under sometimes distinctly unhealthy conditions. If may not be out of place here once more to emphasise the urgent necessity of a comprehensive and permanent water supply for the general purpose of mining development." Mr. Hall draws attention to the surprisingly little systematic prospecting that has been done, and comments upon the fact that this work has generally been confined to certain lines of country. The defective methods of prospecting may be ascribed to the fact that the geology of the low country, in those parts at least where ore deposits appear to prevail, is of a somewhat complicated and difficult kind. The habit and behaviour of the auriferous quartz reefs of what may be called the Murchison Range district, for example, except in so far as they follow the custom of quartz reefs generally, seem to be little understood. Their relationship to the various schists with which they are associated, and above all the influence of these schists upon the character and value of the ore-bodies contained within them, have apparently not be investigated at all. The great advances that have been made in the study of economic geology in various parts of the world, have served to establish the importance of scientific methods even in such an undertaking as prospecting. With the aid of the excellent outline provided by Mr. Hall in his more or less broad survey of the district, some useful progress should be made towards a sound knowledge of its mineral deposits, and further discoveries should be greatly facilitated.

Agricultural Prospects.

Before dealing more particularly, as is intended, with the geological conditions of the country traversed by the new line of railway, it will not be out of place to quote here Mr. Hall's views with regard to the agricultural position. He says: "The opening of the Selati Railway and its extension from Gravelotte westwards through the heart of the 'Mist-belt' along the lower slopes of the Drakensberg will undoubtedly prove of far-reaching consequences to local agriculture. It is only necessary to mention the fact that the whole of the remarkably fertile stretch of country round Tzaneen, the entire district of Agatha and Mashutisberg, together with a by no means inconsiderable portion of the Woodbush Country, will fall within the beneficial sphere of the new railway to show what an impetus will be given to agricultural development. Permanent and abundant water is everywhere close at hand, the soil is of exceptionally fine quality, and the climate healthy; a good proportion of this highly-favoured area, moreover, is Government ground. The above country, more or less co-extensive with the 'Mist-belt' region, together with its southerly extension along the foot of the Drakensberg, is the finest stretch of agricultural ground which has come under the writer's notice during the course of some nine years' travelling through various parts of the Transvaal Province." The region described lies within sight of the mineral areas, and, indeed, overlaps them in part. The water supply, however, does not extend along the auriferous zone, and this has been another among the many obstacles to success that have confronted the small man in the Murchison Range area. It is the intention of the Government to improve matters in this respect, and a detailed inspection and sampling of the various mines is, we understand, actually in progress, with the object of providing such information as will justify the inauguration of an extensive and adequate water scheme for the benefit of the mining population.

Geology.

The map which accompanies this article is taken from the Memoir of the Geological Survey on the Murchison Range District. It will be explained in a succeeding issue. Meanwhile the leading geological features will be seen to comprise wide granite areas, traversed by schists of various kinds, which emerge from below the Black Reef and Dolomite series of the Transvaal system. The schists are regarded as belonging to the Swaziland system, and a direct relationship between them and those of the Mount Mare belt of schists near Pietersburg seems to have been clearly established. The main granite areas are included roughly in the category of the old granite, while a newer intrusion, with wide pegmate zones appears in the Palabora region, and is distinguished in our map by a smaller cross arrangement. Many minor schist zones occur in the field which are either too much covered by granite debris and soil to enable a definite survey to be made, or too small for mapping upon the scale adopted here.

NOTICE: To Mine Managers & Others

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ELEC. ENGINEERS - February - - - - - 66% "
MECH. ENGINEERS - June (Kimberley Centre) - - ALL "
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TO LET ON TRIBUTE.

The Andrada Mines, Limited, intend to let out on Tribute the BRAGANZA MINE, situated in Mozambique Territory, near Macequece. The Company is now working the 3rd level, 400 feet, and developing the 4th level, 520 feet. The output of the Mine since the start has been £61,310, while during 1913, 1914 and the first six months of 1915 £47,000. Conditions of the Tribute can be obtained from the Andrada Mines, Macequece (Portuguese East Africa), on application.

THE WATER SUPPLY OF THE RAND.—IX.

[By W. Ingham, Chief Engineer, Rand Water Board.]*

The Ozone Process.

Many years ago, it was observed that a small percentage of ozone was capable of preserving water from bacterial multiplication. In order to economise ozone, it was, however, found expedient to filter the water previous to treatment in order to eliminate organic matter which, of course, absorbs oxygen. The ozone is prepared from dry air by means of electricity, but sparking between terminals must be avoided. Ozonization commences when the current reaches about 10,000 volts and the production of ozone increases in proportion to the square of the voltage. The ozonizer is a cast-iron box divided by metal partitions in which water-tight glass tubes are inserted. An aluminium cylinder is placed within each glass tube and carefully insulated and is separated from the glass tube by an annular space of about 1-16th of an inch. When the aluminium cylinder is charged at a high potential and the box and enclosed water are to earth, a strong field is set up within the annular space. As soon as the silent discharge favourable to ozonization is established, a slow current of air passing from the lower to the upper end of the compartment carried away a charge of ozone. The sterilizing tower is generally about 25 ft. high by 3 ft. diameter and is enamelled on the inner surface to avoid corrosion. At various points in the sterilizer a series of celluloid sieves with perforations 1-40th of an inch diameter, are fixed so that the water passing through the cylinder is split up into a number of fine jets. The ozone is added with the water at the foot of the tower and passes upwards to the draw-off pipe which is placed at the top end of the cylinder. The energy absorbed per million gallons in the ozonizer averages about 60 B.T.U.s, and a further 75 B.T.U.s are required by the auxiliary machinery. The ozone process has been adopted at a large number of waterworks in France, Germany, and America, and has proved to be thoroughly successful for the removal of B. Coli and pathogenic germs. Dr. S. Rideal, F.I.C., dealing with the De Frise system of ozonizing water, arrives at the following conclusions:—(a) "The ozone treatment of a filtered river water as carried out at St. Maur, Paris Waterworks, by the De Frise process is a satisfactory method of ensuring a standard of purification for a municipal water supply equal to modern requirements." (b) "The De Frise process differs, in my opinion, from all previous attempts at water sterilisation by means of ozone in combining the De Frise steriliser and ozone recuperation system with the Siemens-De Frise Ozonizer, which combination avoids the difficulties attending the use of the emulsifiers and sprayers which have been hitherto used for this purpose, and is attended with a low cost for renewals owing to breakages in the dielectric." Dr. Miguel, the Chief of the Micrographical Service of the Montsouris Observatory, states that the De Frise system is capable of eliminating a large proportion of the bacteria present in the water, and of permanently destroying B. Coli which possesses greater resisting power than the Eberth bacillus and the Cholera spirillum. The capital cost of an ozone plant for purifying one million gallons per day would be about £3,000, and the capital cost per 1,000 gallons, allowing 8 per cent. for sinking fund and interest, 0·158 pence, while the working costs would be 0·460 pence per 1,000 gallons, or a total of 0·618 pence per 1,000 gallons.

Sterilization by Ultra Violet Rays.

A system has been designed for applying the ultra violet rays for the destruction of micro-organisms. It has been discovered that the mercury vapour lamp when constructed with a quartz container is capable of emitting a large number of rays of short wave length at the violet end of the spectrum, and these ultra violet rays have a very powerful bactericidal effect. The results achieved so far seem to indicate that the ultra violet rays can be used for the sterilization of water on a large scale. The lamp is placed in a semi-circular trough and baffle plates are fixed on to the lamp. The lamp is supplied with a current of 3 amperes at a pressure of 220 volts and 120 watts are required for the purification of 1,000 gallons. In this case also it is usually desirable to filter the water so as to obtain the most economical and favourable bacterial results. The capital cost of an ultra violet ray plant would be about £29,000 per million gallons per day, and the capital cost per 1,000 gallons, allowing 8 per cent. for sinking fund and interest 0·152 pence, while the working costs would be 0·48 pence per 1,000 gallons, or a total of 0·632 pence per 1,000 gallons.

Chloride of Lime.

This is the ordinary bleaching powder of commerce and is one of the cheapest and most effective methods of sterilising water. The chemical is mixed with water and is admitted through a pipe controlled by a tap into the water which has to be sterilised. The weight of available chlorine in chloride of lime is about 28 to 33 per cent., and the proportion of chlorine usually added to water ranges between one part per million to about one in three million by weight. The quantity of chlorine required should be decided upon by an able chemist as water often contains organic matter which absorbs large quantities of chlorine.

Effect of Hardness on Death Rate.

Some time ago, I went to a considerable amount of trouble to find out whether towns supplied with soft, or hard, water had the highest death rate. Altogether I analysed the statistics of 274 towns, of which 148 were supplied with soft water and 126 with hard water. The soft water towns consumed 29·27 gallons per head per day, and the hard water towns consumed 24·54 gallons per head per day, so it is evident that towns supplied with soft water used 4·73 gallons per head more than those supplied with hard water. This increased consumption is probably due to soft water being used for industrial purposes. The death rate in the case of 121 towns supplied with soft water was 17·58 per 1,000 as compared to a death rate of 16·43 per 1,000 in 97 towns supplied with hard water. This shows a difference of 1·15 per 1,000 in favour of hard water towns. As, however, the hard water towns are generally in country districts, as distinct from industrial districts, I am inclined to think from a health point of view, that it matters very little whether a town is supplied with soft or hard water. It may be mentioned here that the water supplied on the Reef by the Rand Water Board has an average hardness of about 17 degrees.

Sinking Deep Trenches for Reservoir Embankments.

A novel method of trench sinking has been adopted at the new dam which is being constructed at the Burnley Waterworks, Lancashire. Owing to the faulty nature of the carboniferous formation, the trench had to be sunk to a depth of 214 ft. before a satisfactory bottom was reached, and as the timbering of such a deep trench would be very costly, it was decided to carry out the excavations by driving galleries from a series of shafts sunk on the centre line of the trench. This obviated the shoring up of a wall of earth over 200 ft. deep. After a satisfactory bottom had been reached that portion of the trench was filled in and the earth above was excavated as the core wall was built up. This method has proved very successful and the work is being carried out at a much less cost than it would have been under the old method of sinking from the surface. I understand that the same method was adopted in sinking the trench for the dam at Kinder Scout for the Stockport Waterworks.

(To be continued.)

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* From Presidential Address read before the S.A.I. of E.

THE YEAR WITH THE CONSOLIDATED MAIN REEF.

Increased Profit, Tonnage Crushed and Ore Reserves as Result of Augmented Native Labour Supply.

The tonnage crushed by the Consolidated Main Reef during the year ended June 30th last, shows an increase of 53,759 tons, with a corresponding improvement of profit earned of £21,656. The payable ore reserves show an increase from 693,460 tons, valued at 7.34 dwts. over 48.6 inches, to 855,600 tons, valued at 7.53 dwts. over 48.5 ins. The profits earned during the year amounted to £138,265 7s. 3d.; credit balance brought forward from previous year, £65,423 3s. 1d.; owners' share of claim licences, interest and sundry revenue, £9,674 19s. 3d.; making a total of £213,363 9s. 7d.; from which have to be deducted: Government tax on profits for previous year, £9,961 12s.; audit fees for previous year, £315; shaft sinking, £9,470 16s. 5d.; dividends Nos. 13 and 14, declared during the year, £115,545 10s.; directors' extra remuneration in accordance with the Company's articles of association, £1,700; contribution to miners' phthisis compensation fund, £5,324 4s. 6d.; sundry items, £1,172 5s. 5d.; total, £143,489 8s. 4d.; leaving a balance to be carried forward of £69,874 1s. 3d. The following items of capital expenditure have been incurred during the year: Buildings, £1,789 15s. 8d.; machinery and plant, £11,395 16s. 9d.; shafts, £19,973 0s. 3d.; furniture, £17 10s.; stable equipment, £11 11s. 10d.; dams and surface works, £309 15s. 6d.; total £33,497 10s.; less: Proceeds of sale of freehold stands in Maraisburg, £260; investments sold, £25 15s.; total, £285 15s. Of the total a sum of £9,470 16s. 5d. has been written off the year's profits, the remainder being provided from the funds secured under the amalgamation scheme in 1909, the balance of cash available from this source being at 30th June, 1915, £16,379 19s. 2d. On the 31st December, 1914, the directors declared an interim dividend (No. 13) of 1s. 3d. per share (6¼ per cent.), for the first half year, and on the 30th June, 1915, a dividend (No. 14) of 1s. 3d. per share (6¼ per cent.) was declared for the second half-year, making 12½ per cent. for the year.

The Consulting Engineer, Mr. D. Wilkinson, writes:—The details of the last twelve months' milling operations compared with those of the previous year are as follows: 1914: Tons milled, 241,007; total yield, £379,551; yield per ton milled, 31s. 5.96d.; cost per ton milled, 21s. 9.84d.; profit per ton milled, 9s. 8.12d.; total, £116,609. 1915: Tons milled, 294,766; total yield, £442,649; yield per ton milled, 30s. 0.41d.; cost per ton milled, 20s. 7.83d.; profit per ton milled, 9s. 4.58d.; total, £138,265. There was an increase of 53,759 tons milled and of £63,098 in the total yield; a decrease of 1s. 5.55d. in the yield and of 1s. 2.01d. in the working costs per ton milled, or a decrease of 0s. 3.54d. in the profit per ton milled, and an increase of £21,656 in the total profit, as compared with the previous year. The increase in the tonnage milled and the total profit is due almost entirely to the larger number of native labourers available throughout the year. The average number of natives employed underground was 1,675, as compared with 1,442 during the previous year, and the percentage of rock broken in the stopes by machines was decreased from 60.6 to 58.6 per cent. A total development footage of 18,882 feet was accomplished, showing an increase of 3,872 feet; and, omitting shaft sinking, station crosscuts, and ore chutes, the footage driven, crosscut, raised, and sunk, amounted to 17,405 feet, an increase of 2,977 feet. The driving done on reef and in country was 11,105 feet, an increase of 3,326 feet, this being an enormous footage for a mine which milled at little less than 25,000 tons per month. During the year, 382,620 tons of an average value of 7.85 dwts. over an estimated stoping width of 48.5 inches were developed, thus showing an increase of 144,140 tons and an improvement in the average value of 0.23 dwts. per ton over the exposures of the previous year. The ore reserves are estimated to be 855,600 tons of an average value of 7.53 dwts. over a stoping width of 48.5 inches, an increase of 162,140 tons, and also an increase in value of 0.19 dwts. per ton. Vertical Shaft Section.—The increased development footage has been accomplished entirely in this section of the mine. The total footage done was 9,112 feet, an increase of 5,466 feet, and, omitting shaft sinking, station crosscuts, and ore chutes, the total footage driven, crosscut, raised, and sunk, was 8,118 feet. Almost the whole of the driving has been done on Main Reef Leader, for the South Reef exposed in a few places in this section has shown disappointing values. West Drives.—The reef exposed in these drives gave satisfactory values. Of 4,403 feet driven on the Main Reef Leader, 4,200 feet was sampled, and gave an average value of 8.2 dwts. over an assumed stoping width of 48 inches. East Drives.—The values exposed in these drives on the Main Reef Leader were disappointing. The reef in the eastern drives is much more broken by dykes and faults than in the west, and, of 2,044 feet of driving, only 1,325 feet was sampled. Of this length, 465 feet gave an average value of 9.7 dwts. over an assumed stoping width of 48 inches, and the remaining 860 feet gave quite unpayable values. Considerable progress has been made in the cutting of the engine chamber, etc., for the subsidiary incline at this shaft, and, before the close of this year, this work will be finished. It will be possible during this year to sink this incline to the 27th, and to accomplish some development on the 26th level. Given a continuation of the present labour supply, the rate of profit earned during the past year should be maintained during the ensuing year.

The General Manager, Mr. J. E. Healey, writes, inter alia: Western Section: The auxiliary shaft has been sunk from the 22nd level to the 24th level. The 23rd and 24th stations have been cut and the crosscuts to the reef have been started. A series of ore passes, east of the west shaft, connecting the 16th, 17th, 18th and 19th levels with the main crosscut on the 20th level, have been completed. The bulk of the ore mined in this area is now delivered to the 20th level crosscut and conveyed by animal transport to the vertical shaft. No. 3 (Deep Level) Section: The excavations for the engine chamber and rope-race on the 24th level for the new incline shaft are nearly completed. The 24th and 25th stations in the new subsidiary incline have been cut and a temporary sinking engine has been installed on the 25th station. The main ore bin on the 25th level in the vertical shaft has been completed. This ore bin will serve the new incline. The main haulage drive on the 24th level, connecting the vertical shaft with the west incline, has been advanced a further 958 feet. The connection with the West Shaft should be made during the present financial year. Ore Reserves.—The payable ore developed and exposed during the year amounted to 382,620 tons, valued at 7.85 dwts over a stoping width of 48.5 inches. The payable ore reserves were re-calculated as at the 30th June, 1915, and stand as follows:—Main Reef Leader: 809,550 tons; value, 7.64; assumed stoping width, 48.5 ins. South Reef: 46,050 tons; value, 5.59; assumed stoping width, 48.0 ins. A total of 855,600 tons; value, 7.53; assumed stoping width, 48.5 ins. Mining.—A total of 337,805 tons was mined, classified as follows: From hand stoping, 115,273 tons; from hammer machine stoping, 38,784 tons; from small reciprocating machine stoping, 124,213 tons; development, 32,920 tons; reclamation, 26,615 tons; a total of 337,805 tons. The stoping width averaged 50.9 ins. The following table shows the tonnage mined from the different reefs in the two sections:—Western Section: Main Reef, 6,722 tons; Main Reef Leader, 235,702 tons; South Reef, 28,650 tons; total tons, 271,074. Eastern Sections: Main Reef Leader, 22,585 tons; South Reef, 44,146 tons; total tons, 66,731. The grand total being: Main Reef, 6,722 tons; Main Reef Leader, 258,287 tons; South Reef, 72,796 tons; total 337,805 tons. General.—All machinery and plant have been maintained in efficient repair during the year. The erection of the 150 drill turbo compressor was completed during the year, and is running satisfactorily. The signalling and lighting systems in the West Incline have been completely renewed. I wish to record my appreciation of the assistance of the staff and employees during the year.

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THE SEPTEMBER OUTPUT: GROUP RETURNS.

Rand Mines Group.

The following are the results of crushing operations of subsidiary companies for the month of September:—

Company	No. of Stamps Running.	Tube Mills	Tons crushed	Estimated Working Costs per Ton.	Total Fine Ozs	Total Estimated Profit.
Rose Deep	300	7	66,300	17/ 0.7	18,065	£18,535
Geldenhuis Deep	300	7	55,000	21/ 0.5	16,687	11,484
Nourse Mines ..	260	7	57,400	19/ 11.4	16,449	11,095
Ferreira Deep .	280	7	56,410	18/ 2.7	24,668	50,887
Crown Mines ...	660	26	207,000	16/ 1.2	63,057	95,515
Durban Rd. Dp.	100	3	26,600	22/ 9.8	8,732	5,850
Ttls. & averages	1900	57	468,710	17/ 11.1	147,658	£193,366

The following are the results of crushing operations of Central Mining Companies for the month of September:—

Company.	No. of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton	Total Fine Ozs.	Total Estimated Profit.
Modder B... ...	*96	6	45,000	14/10.9	22,787	£61,160
New Modder ...	180	7	51,000	17/ 5.4	24,604	57,762
City Deep	†154	9	61,000	19/ 0.6	28,489	60,086
Village Deep ...	180	7	52,400	19/ 5.2	18,450	25,771
Village Main R.	160	4	30,000	18/ 7.6	12,899	25,668
Robinson	250	6	55,300	14/ 4.7	18,812	38,403
Bantjes Cons. .	100	3	20,500	20/ 8.4	5,400	1,112
Ttls & averages	1120	42	315,200	17/ 6.2	131,441	£269.962

* Includes 16 Nissen stamps.
† Includes 4 Nissen stamps.

Modderfontein B Gold Mines, Ltd.—Grade ore mined still above the average value of the ore reserves.

Rose Deep, Ltd.—Decreased profit due to temporary drop in grade and smaller tonnage crushed.

Albu Group.

The following information is officially supplied regarding the September operations of the producing companies of the group:—

Company.	Stamps.	Tons Crushed.	Total Cost.
Aurora West	80	15,066	£13,795
Meyer and Charlton	75	14,544	13,356
New Goch	120	29,700	21,027
Roodepoort United	75	33,851	28,485
Van Ryn Estate	140	38,250	27,761
West Rand Consolidated ...	100	31,200	28,479
	590	162,611	£132,903

Company.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	18/ 3.8	£17,834	£4,039
Meyer and Charlton	18/ 4.4	34,123	20,767
New Goch	14/ 1.9	29,062	8,035
Roodepoort United	16/ 9.9	31,024	2,539
Van Ryn Estate	14/ 6.2	47,360	19,599
West Rand Consolidated ...	18/ 3.1	38,757	10,278
		£198,160	£65,257

Barnato Group.

The results of operations of the Barnato group for September are as follows:—

Mine.	Stamps.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte ..	100	51,700	£70,091
Ginsberg	75	15,375	17,792
Glencairn Main Reef	160	21,300	14,373
Government G.M. Areas ..	100	49,100	66,735
New Primrose	140	23,100	19,276
New Unified	60	13,550	14,092
Quest	35	3,801	2,771
Van Ryn Deep...	80	42,020	78,664
Witwatersrand	215	41,900	53,137
September totals ...	965	264,846	336,931
August totals	1,015	270,284	£340,832

Mine.	Total Working Costs.	Working Costs per Ton Milled.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ..	£41,668	15.235	£29,024
Ginsberg	13,749	17.885	4,169
Glencairn Main Reef	12,113	11.374	2,430
Government G.M. Areas ..	51,945	21.159	15,216
New Primrose	13,343	11.553	6,077
New Unified	9,152	13.508	5,037
Quest	2,477	13.032	420
Van Ryn Deep	36,265	17.261	43,119
Witwatersrand	29,979	14.310	25,035
September totals ...	£210,691	15.910	£130,527
August totals	£207,976	15·389	£136,953

Monthly Gross Profits.—January, £126,738; February, £118,382; March, £128,225; April, £128,526; May. £131,577; June, £134,592; July, £135,782; August, £136,953; September, £130,527.

Goerz Group.

Results of operations of the producing mines of this group for the month of September, 1915:—

Company	Stamps.	Tons Crushed.	Total Revenue.	Revenue per ton.
Geduld Proprietary	60	25,700	£40,168	31/ 3
May Consolidated	100	14,300	11,396	15/11
Modder Deep Levels	60	34,500	62,995	36/ 6
Princess Estate	60	21,500	28,268	26/ 4
Totals	280	96,000	£142,827	–

Company.	Costs.		Profit.*	
	Total.	Per Ton.	Total.	Per Ton
Geduld Proprietary	£27,390	21/ 4	£12,778	9/ 11
May Consolidated	10,365	14/ 6	1,031	1/ 5
Modder Deep Levels ...	28,249	16/ 4	34,746	30/ 2
Princess Estate	27,512	25/ 8	756	0/ 8
Totals	£93,516	—	£49,311	—

Geduld Proprietary Mines, Ltd.—Reserve gold, 4,431 ozs.
*Including Sundry Revenue.

Neumann Group.

The following are particulars of the results achieved by the crushing companies of this group during last month, and officially supplied, viz.:—

	TONS.	YIELD.	PROFIT.
Witwatersrand Deep	41,730	£52,701	£16,034
Wolhuter	34,800	42,592	13,672
Consolidated Main Reef .	28,090	41,123	13,547
Main Reef West	25,020	28,060	3,671
Knight Central	28,030	30,945	4,062
Total for group		£195,421	£50.986

DIAMOND CUTTING: THE FINANCIAL ASPECT.

Conclusions of Mr. Arend Brink's Pamphlet on the Unwisdom of Tampering with the Industry.

The following is the concluding chapter of Mr. Arend Brink's exhaustive pamphlet, issued recently to combat the proposal to start a diamond cutting industry in South Africa:—The diamond market is the most sensitive of all markets by reason of the fact that the diamond is almost entirely an article of luxury. The stocks held by the trade are enormous, and constitute an element of anxiety during times of depression or of political unrest. It may be computed that in normal times the stocks of rough diamonds in the hands of producers, dealers, and manufacturers amount to approximately £8,000,000. During the crisis of 1908, a personal investigation revealed the fact that the stocks held amounted to no less than £19,000,000, and the exhaustion of credits, caused by this enormous accumulation, resulted in the subsequent collapse and disorganisation of the diamond market. The diamond business is most delicate and intricate, and a mature judgment cannot be arrived at without a knowledge of the conditions which govern its disposal during the different stages the diamond has to pass through before it eventually reaches the public. The conditions which govern its control, the regulation of the supply which the world will absorb without any danger of depreciating its value, and the general conditions which help to determine the price, are factors which must be carefully studied. It is essential that manufacturers should keep in constant touch with their clients in the centres of consumption, so that the requirements of the trade, which change with other fashions, may be constantly brought to their notice. Even in the rough trade, the principle of keeping in touch with the varying demands of the European market, is recognised by the Syndicate, by the Premier Company, and by all other dealers of consequence, who invariably keep duplicate staffs of sorters for the reassortment of the diamonds in London. The diamonds are classified on some standard basis in South Africa, and upon their arrival in London they are reassorted to meet local conditions. Under existing conditions, dealers and manufacturers with limited capital make their purchases in London, and are able to place their diamonds on the mill, or on the market, as the case may be, within a comparatively short time. They are financed by banks who are able to keep in touch with them, and to follow the ramifications of the trade. If the whole of the industry, or any considerable part of it, be transferred to South Africa, a large percentage of those now engaged in the trade would be compelled by their comparatively limited resources to withdraw their capital from the diamond trade and to divert it into other channels of industry. It would result in the loss to the diamond trade not only of the capital of the individual traders, but also of the vast amount of capital placed at their disposal by banks on the Continent which specially cater for this business. The larger the amount of money involved in the trade, the greater is the measure of security against financial collapse, and the greater the number of people interested in bringing an article of luxury prominently and constantly before the public, the larger is the demand for that article likely to be. It is therefore entirely in our interest to retain both the capital now at our disposal, and the numerous agents in whose interest it is to push our wares. Upon these two factors the continued prosperity of the trade largely depends. The business in rough diamonds, so far as the producers are concerned, is conducted on a cash basis.

The Diamond Mining Companies, notwithstanding their vast financial resources, could not possibly face the enormously increased financial responsibilities which the transference of the cutting industry to South Africa would entail. The cut trade is conducted on the credit system, involving from six to eighteen months credit, and the enormous risk of having to give credit to purchasers living in Petrograd, New York, Paris, Berlin, Vienna, Rome, and the various centres in the South American Republics, with whom no one on this side of the Atlantic could possibly be in direct touch, would not be lightly undertaken by any financial institution. Under the present system a number of wealthy firms use their capital as intermediaries to provide the credits for the trade. In addition, bankers also largely discount bills, and in this way a vast amount of capital not directly interested in diamonds is available for the purposes of the trade, and is of inestimable service to the industry. These facilities would for obvious reasons not be extended to an oversea trade, as no prudent financier would take the risk involved in giving credit to people with whom he could not possibly be in touch. These numerous agencies for carrying stocks of both rough and cut diamonds materially promote trade in times of prosperity and are indispensable in bad markets. No chain is stronger than its weakest link, and no financial system can be said to be effective which does not provide means of weathering the financial storm in a bad market. That the Diamond Mining Companies could not finance a local cutting industry is demonstrated by the fact that during the first six months of the great European war, both the De Beers and the Premier Companies found it expedient to pass their Preference Dividends in spite of their reserves. It would be most imprudent, in view of the facts bearing on this question, to weaken the financial supports of the diamond trade in any way. The trade is highly specialised, and has been placed on a comparatively sound basis by the industry, perseverance and dauntless energy of some of the ablest financiers.

CONCLUSION.

The question of the establishment of cutting factories here with the object of competing in the European market is purely an economic one, and should not be drawn into the political vortex to become the sport of party politicians. There is, however, great danger that it will serve as an alluring election cry in the platform of a certain political party, whose leaders have earned the doubtful reputation of defying law and order, and who appear to be obsessed with the idea that it is their particular function to destroy both capital and constituted authority, oblivious of the fact that the destruction of capital must recoil upon labour and diminish profitable employment. It is most remarkable that a policy which aims at the introduction of the foreign labourer to the detriment of those employed in the production of diamonds in this country should be advocated by those who profess to speak on behalf of labour, as there can be no doubt that the establishment of the cutting industry here on a scale to compete in the European market can only be accomplished by a measure of tariff reform which must inevitably result in a diminished production, and therefore in the reduction of the number of both European and native labourers employed in the industry. The levy of an export tax on home products, excepting for purely revenue purposes, is an economic fallacy, which must be unreservedly condemned by an enlightened public conscience. It is a vital principle which strikes at the root of our future policy in regard to the raw products of the country. The application of such a principle to wool, mohair, and hides would be infinitely more justifiable in view of the fact that the bulk of these products are manufactured in the British Isles and foreign countries, and are eventually consumed here in the manufactured state, whereas, with the exception of an infinitesimal percentage, the diamonds are consumed by foreign countries. Would the advocates of the establishment of a diamond cutting industry in this country favour the extension of the same principle to ostrich feathers, so that the preparation of these for the European market might be undertaken in South Africa and the youth of the country trained to an essential South African branch of industrial work? Would they favour the application of the principle to wool, mohair and hides, which would certainly be more in the interest of the country to manufacture locally? The idea of taxing one industry in order to establish another is chimerical, and unworthy of serious consideration. The only effective method of establishing local factories is to tax the imported manufactured article, a principle which applies to diamonds as forcibly as it does to any other raw product. It has been suggested that diamond mining is a vanishing industry, and yet it is seriously proposed to establish a new industry which is entirely dependent upon what is regarded as a vanishing industry for its continued existence. The imposition of a tax on a raw product is a crude method of establishing a new industry, and as a matter of public policy, bearing in mind all the issues involved, the levy of any tax sufficiently high to ensure the cutting of any part of our production here in competition with the European cutting centres would be wholly indefensible and impolitic, and is only advocated for political reasons in order to launch an attack on a certain section of capitalists regardless of the ultimate effect of such a policy on our European and native labour.

CORRESPONDENCE AND DISCUSSION.

S.A. Association of Analytical Chemists.

To the Editor, *South African Mining Journal.*

Sir,—A register of chemists at present resident in South Africa is being prepared in order that, if the need arises, no delay may take place in finding competent men for munition manufacture, control of munition manufacture, or for other purposes in connection with the war. The registration is voluntary, and of course entails no obligation to serve, but it is hoped that all chemists will register, in order that a true measure of the resources of South Africa may be obtained. The South African Association of Analytical Chemists is circularising all its members on this subject, but as the names and addresses of all chemists are not known, any person with chemical or metallurgical experience who does not receive a circular by the 21st instant, is requested to communicate with the undersigned at the above address. The registration has met with the approval of the Hon. J. C. Smuts, Minister of Defence.—I am, etc.,

JAS. GRAY, Hon. Secretary.

Box 5254, Johannesburg,
October 2nd, 1915.

ANSWERS TO CORRESPONDENTS.

"Interested."—Your letter has already appeared in the daily papers.

"Krugersdorp."—The question is purely one of party politics.

"Shareholder."—The matter is being submitted to arbitration.

"P. S." (Kimberley).—We know of no firm dealing in raw asbestos in this country. Last week's issue of this paper, which probably crossed your letter in the post, contained the information on asbestos you require.

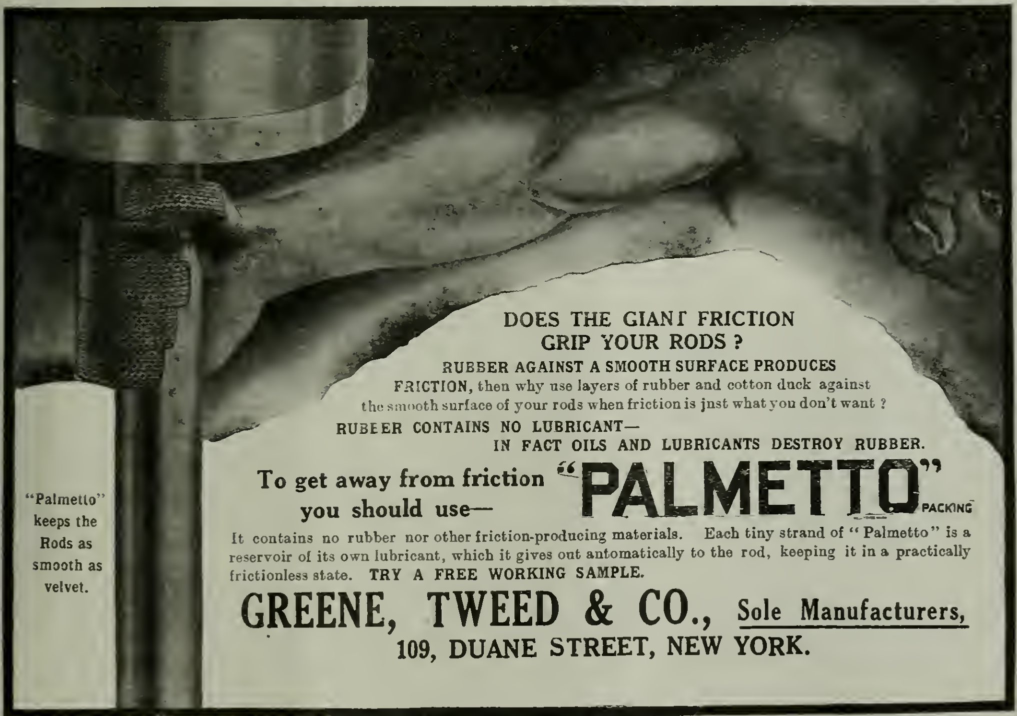
"Salt."—Address sent by post.

"Diamond Cutter."—Mr. Hay doubtless has a remedy at law against the paper in question, if he thinks himself libelled.

Robinson Group.

The results for September in the Robinson Group are as follow :—

	Tons milled.	Estimated profit.	Profit per ton milled.
Langlaagte Estate... ...	51.236	£13,626	5 3,82
Randfontein Central ...	206.178	58,756	5 8.39



DOES THE GIANT FRICTION
GRIP YOUR RODS ?
RUBBER AGAINST A SMOOTH SURFACE PRODUCES FRICTION, then why use layers of rubber and cotton duck against the smooth surface of your rods when friction is just what you don't want ?
RUBBER CONTAINS NO LUBRICANT—
IN FACT OILS AND LUBRICANTS DESTROY RUBBER.
To get away from friction you should use— "PALMETTO" PACKING
It contains no rubber nor other friction-producing materials. Each tiny strand of "Palmetto" is a reservoir of its own lubricant, which it gives out automatically to the rod, keeping it in a practically frictionless state. TRY A FREE WORKING SAMPLE.
GREENE, TWEED & CO., Sole Manufacturers,
109, DUANE STREET, NEW YORK.
"Palmetto" keeps the Rods as smooth as velvet.
CARRIED IN STOCK BY BARTLE & Co., Ltd., Johannesburg; E. W. TARRY & Co., Ltd., Kimberley.

STOPING METHODS AND DRILLING PROBLEMS ON THE WITWATERSRAND.—III.

[By E. M. Weston.]*

The Cost of Drill Steel and its Maintenance.—This is a more important item as regards the relative efficiencies of hammer and piston drills on the Rand than elsewhere. When the ground is in any way soft, as in the Kimberley diamond mines, hammer drills for most work at once prove their superiority. On the Rand it has been stated that this represents twice the expenditure of solid steel for piston drills. This in itself is no large item, but the matter does not end at this. Hollow steel is harder to sharpen and to temper correctly than solid steel, and the majority of the blacksmiths on the Rand are either not given the time or have not the skill to do this well. In America and on the Continent of Europe this matter receives the attention of technically trained men, and is given the attention of its importance. No mining house has used the services of a real expert to lay out a scheme of work and supervise it. They do this and acknowledge the necessity of it if it be a matter of saving 1d. per ton in cyanide costs, but in the vital matter of breaking the ore it does not seem at first sight to be necessary. In all cases I have examined, work goes on by rule of thumb, the great object being apparently maximum output in minimum time. With hollow steel there is always a far larger number of imperfectly tempered drills than there is with solid steel, and this directly affects the efficiency of the drilling work of the hammer drill. Then, again, not only does the drill bit in most cases require special care in tempering, but the shank of the drill gives greater trouble, as it has to resist the blows rained upon it by the hammer. The difference of gauge between bits is often gradually made greater to allow for bits that are soft or which chip away, and the hammer drill is called upon to excavate much more rock than was anticipated at first. Its drilling rate naturally falls off. Machine sharpening has in this respect a great advantage. Again, it has been proved that on the Rand in ordinary hard ground the blunting and wear of steel in hammer drill holes is nearly double that of steel used in piston drills, and instead of the difference in length of drill steel being two feet, as in piston drills, it is only one in most hammer drills. This means that, in order to drill the same length of hole, twice as many separate lengths of steel have to be transported and sharpened, there is twice the risk of finding a badly tempered bit, twice as many shanks to suffer damage, and the weight of steel required to drill a hole is greater. The cost of sharpening solid drill steel in one mine where the ground is comparatively soft, and the drills used nearly all 3¼ in. machines, is only 1s. per machine shift, or about 1d. per ton broken. In a Central Rand mine, using about half 3¼ drills and half 2¾ in. drills, the cost is 11d. per shift or 1½d. per ton broken. On two mines, where the stoping efficiency is low, the cost per shift is 15d. to 18d. and 2d. to 2½d. per ton broken. On these mines 18 to 27 per cent. of the machine shifts were with hammer drills of various kinds. On one large mine, where nearly 50 per cent. of the machine shifts worked were hammer drill shifts, including at least some 10 per cent. of hammer drill shifts using hollow steel, the cost was 24d. per shift or 2⅔d. per ton broken. If we estimate extra cost and extra wastage of hollow steel at another 1d. to 1½d. per ton, the whole item is after all a very small one. On the Robinson Deep the cost of sharpening and replacing drill steel is stated to be 6 per cent. of the total stoping cost of about 4s. to 6s. per ton. It is evident that if we could make sure that the hollow steel was so well sharpened as to be efficient, and if only a small increase of drill speed and rock broken was attained, we could easily afford to spend 3d. to 4d. per ton in sharpening drill steel. For stoping work, however apart from development, the line of advance lies in using hollow steel in hammer drills rather than solid or hollow steel in piston drills. One may still ask, however, whether further progress with piston drills is really impossible and whether we are getting all the efficiency from them we should? Are we using solid steel to the best advantage in ordinary piston drills, and is there not still scope for improvement? Some time since the mining industry spent several thousand pounds on an investigation of drill steel. The investigator, after exhaustive experiments, made a number of recommendations. He recognised the supreme importance of having drill bits "true" in every particular, so that not only should the shank be in a straight line with the axis of the piston, but that the outside edges of the bit be included in a true circle. This is a cause of serious power losses and loss of time, and destroys efficiency. He recommended that hand sharpening practice be modified so that every drill steel be passed through a proper gauge circle while sharpening, insuring that it be round and that the correct gauge be given. Such a change would increase the cost of sharpening a few shillings per hundred drills. The benefits are undoubted, yet no attempt has been made to adopt the recommendation. It is, fortunately, true that machine sharpening has since been introduced to a large extent and has remedied the defect, but there is a great deal of sharpening still done by hand in which the gauge is judged only by the eye, and there is no doubt that inefficiency is caused by untrue and badly gauged bits. There is another glaring cause of inefficiency which no one has hitherto dared to tackle, because its importance has not been appreciated, and the difficulties in the way of remedying it seem great.

Varieties of Steel Necessary.—It is a grave mistake to use the same drill steel for boring dry up holes as for use in the ordinary wet holes. Under present conditions it takes nearly one working shift to put in an upper hole in some of the harder mines with solid steel in development work, and largely for this reason hammer drills are being introduced with success. Practically nothing has been done to endeavour to improve the efficiency in drilling up holes and at the same time to increase drilling speed in down holes. There is a fear of introducing further complications in the already often badly organised department of drill supply and distribution. This is a very real and difficult problem, but underground sharpening stations and machine sharpeners are doing much to simplify it. At the present time all steel for large drills is cut with about 2 ft. difference of length and a difference of gauge of ¼ in. Sometimes the difference between starter and second is more than this, to allow of the extra wear in starting a hole. It may be argued that under present conditions a back hole should be drilled with water supplied to the end of the hole, and that the excessive wear and blunting of bits drilling any holes is unnecessary. Unfortunately, the fact remains that though some miners do now use a water jet of some kind to drill the first foot or two, many do not do even this. It is only under the somewhat exceptional condition of having the water pressure right and both hose and jet in excellent condition that a back hole will be drilled wet. The thin Mannesmann steel and copper piping used for this soon gets damaged, and the natives on the slightest excuse cut the hose and throw the jet away. The native does not want to use water or get wet, and the miner usually will not compel him to do more (if he does that much) than to squirt water at the mouth of the hole to kill dust. The best will in the world on the part of supervisors and mining inspectors is powerless against apathy or opposition of all labour. So the fact remains that most back holes are still drilled dry, and this means that the steel quickly heats up, the bit loses its temper and is quickly blunted, powdering up its own cuttings. It is ridiculous to expect a drill to stand for 20 or 24 in. under these conditions. The blunt drill is merely bumping and crushing the rock, instead of cutting it most of the time, and the miner has difficulty even with ¼ in. difference of gauge in getting steel to follow. Pressure is put on the drill sharpener to make the difference even greater. In any case the difference of gauge designed for drill holes causes an almost incalculable loss in drilling wet holes, because in these holes the rock drill has to excavate 10 to 20 per cent. more rock than is really needful. This alone means reduced boring speed and the loss of many rounds in development where the miners have just failed to get through.

Suggested Modification of Work.—I would suggest the following modifications in practice. I would provide separate sets of drill steel separately sharpened for boring dry holes. To distinguish them at once from ordinary drill steel I should make them solid, without welding, and of suitable sizes of star section steel. They could be easily procured twisted to form a rotary conveyor to pass cuttings down the hole. I should make the lengths of different steel differ only by 12 in. with ⅛ in. difference in gauge of the following steel with perhaps variations to suit the ground. The first result of the change would be that upper holes in hard ground would be drilled in half the time. The second effect would be that it would be at once possible, I believe, to cut down the difference of gauge in the steel used for wet holes to ⅙ in. or ⅕ in. for anything like average ground, certainly for most Far East Rand ground. This would mean that instead of a set of steel being 2¼ in., 2 in., 1¾ in., and 1½ in. for a seven-foot hole, we would use 2 in. or 1⅞ in., starter, 1¾ in., 1⅝ in., 1½ in., and this would mean that the amount of ground excavated would be reduced 20 per cent. with corresponding increase in drill speed, or if necessary a greater number of smaller drills could be employed. Where the rock is hard 3-16 in. difference should be ample, or better still in this case, the difference of lengths of steel be cut down to 18 in. with about ⅓ in. difference of gauge. To realise these benefits more attention must be paid to sharpening. In this connection the experiments conducted by Mr. Robert Allen for the Mines Trials Committee in 1910-1911 are most interesting. He showed that by adopting a proper system of gauging bits when being sharpened by hand and by forming the bits in such a way that reaming edges were formed on the outside of the wings, even with chisel bits 24 in. of hole could be drilled in hand stopes of the Robinson Deep with a loss of gauge of only about one-sixth of an inch, and no doubt better results would have been obtained with star bits. This proved conclusively that it is practicable to make the reductions here advocated. I think that something of the success gained by some hammer drills is due to the fact that the users of them have been compelled to cut down the difference between drill steels to 12 or 18 in. and this means, other things being equal, that these drills do more economical chipping of rock at the bottom of the hole and less bumping and crushing.

(To be continued.)

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*In the *Mining Magazine*.

Rhodesian Section.

LATEST MINING NEWS.

Rhodesia Chamber of Mines' Report—Cam and Motor—The Antelope—Eldorado Banket—Gold Fields Rhodesian Development—Willoughby's Consolidated—Rich Strike at Que Que. —Mashonaland Consolidated.

It is stated that a rich reef has been discovered a short distance from Que Que, going 3 ozs. over 3 ft. The syndicate owning it are all local business men, who will leave no stone unturned to develop it, says the "Bulawayo Chronicle." They have a fair amount of local capital at their call, and it is hoped the find will be successful.

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The report of the Executive Committee of the Rhodesia Chamber of Mines for the month of August states that payments during August amounted to £179 17s. 6d. The overdraft on the 31st August was £838 3s. 11d. £2,400 remained on fixed deposit. The following is a summary of the returns of native labourers employed on Southern Rhodesian mines during the months of June and July:—

	June.	July.
Local	14,043	14,018
Portuguese Territory	7,002	7,354
Nyasaland	8,934	9,196
Northern Rhodesia	9,045	9,408
Other sources	1,109	937
Totals	40,133	40,913

The number employed in July shows an increase of 2,106 as compared with the same month of 1914. Particulars have been received from the General Manager of the Beira and Mashonaland and Rhodesia Railways of the rates which will be charged on gold slags consigned to the Falcon Mines, Ltd., for treatment. It has been pointed out that the application of the rates to a minimum of one ton will preclude advantage being taken of the rate except by the largest producers, and reconsideration of this point has been asked for. The attention of the Government has been drawn to the necessity of closer supervision and more frequent inspection of country hotels, especially in regard to accommodation and sanitary conditions. Mr. R. H. Urmson has become a member of the Chamber under Rule 6. Messrs. Theo. Haddon and L. Ludlow have been granted six months' leave of absence. Mr. T. H. Cooke has been appointed alternate for Mr. Ludlow. Letters have been received on the following subjects, and are open for inspection of members at the offices of the Chamber: Supplies of zinc from Australia; demand for wolfram for munition works. The following matters have received the attention of the Committee during the month: Mine medical conference; mine employees and the war; Gold Trade Ordinance, etc.

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Recent developments in the main south drive of the No. 6 level at the Motor mine has been disappointing, as will be seen from the annexed figures:—

	Distance.	Average width.	Average. value.
January	36 ft. ...	53 in. ...	83/-
February	41 ft. ...	47 in. ...	57/-
March	60 ft. ...	72 in. ...	54/-
April	55 ft. ...	60 in. ...	47/-
May	77 ft. ...	53 in. ...	38/-
June	66 ft. ...	57 in. ...	43/6
July	19 ft. ...	29 in. ...	14/-
August	10 ft. ...	— in. ...	6/-

In addition to a decrease in width the latest values are unpayable. It would be wrong perhaps to assume that the limit of the pay shute has been reached, but the gradual declension in values might point to such an event. A north drive has been started off the cross-cut, and the 9ft. advanced have disclosed reef 36 in. wide, worth 28s. A winze 580 ft. south, sunk from No. 6 level, is down 24 ft. in ore 56 in. wide assaying 79s. per ton.

The total tonnage developed at the Antelope during the June quarter was 9,731 (of which 4,694 tons resulted from an increase of the stope width) of the satisfactory value of 12 dwt. The tonnage milled was 12,090 of a value of 11.4 dwt. A very satisfactory feature is the continuance of good values in the 12th level, where the pay shute has lengthened out from 123 ft. to 249 ft.; the average width has increased from 59.2 in. to 61.6 in., and the average value of 14 dwt. compares with 15.7 pennyweights. Moreover, in the winze to the 13th level, which is now down 59 ft., and the rise to the 10th level, which is up 34ft., the reef is stated to be looking well, and as a result 7,348 tons, valued at 13.6 dwt. have been added to the ore reserves. Once more costs work out at 30s. 9d. per ton, which is still along way ahead of the official estimate of 25s. Mining is 11d. lower at 6s. 2d., but some other expenses are higher, and for the first time royalty, which works out at 2s. 2d. per ton, is given separately; hitherto it has apparently been included in general expenses, which are now 3s. 6d., against 5s. 5d. at the end of March.

*   *   *   *

A larger addition was made to the Eldorado ore reserves during the June quarter than the quantity milled, though the value shown was lower, possibly on account of reclaimed ore not previously included in the reserves. The total at June 30 last was 57,956 tons of an average value of 13.5 dwt., in comparison with 54,844 tons worth 14.2 dwt. at the end of March. A rise from the 16th level has connected with the E. 2 P. main winze from the 15th level, the total length being 118 ft., the reef assaying 97.2 dwt. over 49 in., or 16.1 dwt. with high values reduced. The main drive west at the 16th level shows, after passing through 7 ft. of dyke, 20 ft. worth 13.5 dwt. after reducing high values. The present working, however, is in unpayable ground, as the last 42 ft. only assayed 1.1 dwt. over 72 in. The main drive east was advanced 39 ft. and disclosures were poor. The Main Reef pay shute has a distance of 140 ft. assaying 12.9 dwt., with reduced values. Development at various other points was disappointing.

*   *   *   *

The London Board of the Goldfields Company have notified employees on their subsidiary properties in Rhodesia to the effect that men leaving for the front on their own initiative will not come under any previous conditions offered by the companies, owing to the fact that skilled mining labour is very scarce, consequently skilled men leaving the country now seriously affect the gold production, which must be kept up with the utmost vigour. It therefore behoves men to seriously consider this crucial point before throwing up their billets and leaving the mine management in a dilemma. Both the Globe and Phoenix and the Gaika mines have responded beyond all expectations in sending men to the front, but it appears the climax is now reached, and gold production must not be interfered with. To win this war the gold is as necessary an adjunct as the men.

Situation Vacant.

WANTED AT ONCE.—A Tip-Top Fitter for Supervising the Shops and Mechanical Repairs on the Dredge. Salary £35 for one month trial; if gives entire satisfaction, £40

Applications, with particulars and testimonials, to Andrada Mines, Limited, Macequece (Portuguese East Africa). Recommendations from firms known to Andrada Mines preferred.

The ordinary general meeting of Willoughby's Consolidated Company, Ltd., was held in mail week. Colonel H. T. Fenwick, M.V.O., D.S.O., presided in the absence of Major Sir John C. Willoughby, Bart. and Lieut.-Colonel A. Weston-Jarvis, C.M.G., M.V.O., who were serving their country, and stated that owing to the depression in all mining securities prior to and consequent on the outbreak of war, few changes could be made in the company's investments, and the only difference was the sale of one investment, which resulted in a satisfactory profit. The board thought that as they saw an opportunity of realising one investment at a profit it was wise to do so, because if the war went on for a long time the company would require all the liquid assets they could possess themselves of. The directors did not attempt to value their investments at the present time. Any one who had any knowledge of market movements must know that any prices quoted now were merely nominal; but the board thought it prudent to write off £75,000 of the book cost of their investments to the end of the year under review. In his opinion such shares as the Eileen Alannah were worth a great deal more than the amount at which they appeared in their balance-sheet. Referring to the profit and loss account, the result of the year's working was what he would call a miserable profit of £9,848; but considering that the war was going on for six or seven months during the year under review and had dislocated everything, he thought they might consider themselves fortunate to be able to show such a profit. Since the war started the expenses had been reduced as much as possible consistent with efficiency. The principal asset of the company was its land holdings, which consisted of 1,263,000 acres; 15,808 acres were sold during the year at an average price of 15s. 9½d. per acre. Their total stock of cattle on hand at December 31 last was 8,678, as compared with 7,518 in 1913. The revenue from their town sites and buildings was well maintained. In the course of a discussion, Mr. Thornton called attention to the high proportion of expenses as compared with other Rhodesian companies, and also asked why the directors had made an advance of £2,110 to their managing director. The Chairman, in reply, stated that he did not consider the expenses of management were higher than other Rhodesian companies. The advance to the managing director was a personal one. That gentleman was one of the oldest employees in this company, and one of the leading men in Rhodesia. The directors took full responsibility for this advance, in respect of which interest was being regularly paid.

* * * *

At the annual general meeting of the Mashonaland Consolidated (1912) Company, in mail week, Mr. H. P. Clemes, who presided, said that bad as the depression was when they met a year ago, the conditions of war had made matters since much more disastrous to the company than anyone had anticipated. The stagnation in the Mining Market and the impossibility of obtaining capital for any enterprise made the direction of a company like theirs extremely difficult. The company now was merely marking time, and when the piping times of peace came along, as they all hoped they would soon, he predicted that he would then have a more satisfactory state of affairs to place before the shareholders.

Luipaardsvlei Estate.

During the month of September 21,160 tons were crushed by the Luipaardsvlei Estate, the profit for the month being £4,390.

Glynn's Lydenburg.

The following are the particulars of this Company's output for September:—Tons crushed, 4,026; yielding 1,453.992 fine ounces; estimated value of month's output, £6,096; estimated profit for the month, £1,924.

Transvaal G.M. Estates.

The following are the particulars of this month's output: Central Mines: Tons crushed, 10,900; yielding, 5,823.872 fine ounces. Elandsdrift Mine: Tons crushed, 500; yielding, 693.653 fine ounces. Vaalhoek Mine: Tons crushed, 1,410; yielding, 488.721 fine ounces. Estimated value of month's output, £29,325; estimated profit for the month, £13,646.

Brakpan Mines.

The following information in regard to the September, 1915, output is officially supplied:—Stamps working, 140; running time, 28 days; ore crushed, 61,800 tons; tube mills working, 10; ore hoisted, 71,059 tons; ore from dump, nil; waste sorted, 12.96 per cent.; fine gold declared, 20,734.70 ozs.; value declared, £87,283 (equal to 28s. 2.96d. per ton milled); working costs, £56,261 (equal to 18s. 2.49d. per ton milled); working profit, £31,022 (equal to 10s. 0.47d. per ton milled).

Manicaland Output.

The mineral output of the territory of the Companhia de Mocambique (Manicaland) for the month of August, 1915, was as follows:—Reef—Mill: Gold won (fine), 364 ozs. 15 dwts. 15 grs.; tons crushed, 915; value, £1,295 8s. 3d. Concentrates (estimated): Gold (fine), 6 ozs.; tons, 3; value, £25 10s. (Also contains silver an dlead estimated value, £15 4s. 9d.). Cyanide: Gold recovered (fine), 46 ozs. 5 dwts. 5 grs.; tons, 870; value, £191 14s. 11d. Alluvial: Gold won (fine), 460 ozs. 14 dwts. 9 grs.; cubic metres dredged, 53,580; value, £1,909 19s. 1d.

Sakalava Oil.

The Secretary writes: We have this day received cable information from Mr. G. M. Robinson, manager of the above Company, that No. 3 well has reached a depth of 1,580 feet, the formation being shale. Drilling operations had to be temporarily suspended owing to it being necessary to cement off an inflow of water.

The Sheba.

The following are the results of operations at the Sheba mine for the month of September, 1915:—Crushed, 6,920 tons, yielding 2,491 ozs. fine gold; estimated profit, £1,835.

For Sale.

Three pair Holman Pneumatic Stamps, No. 1 size, complete. Pair undertype Robey Winders, 14½" Cylinders, Boiler 100 lbs.

Pair modern Horizontal Winding Engines, drop valves, Cylinders 22" by 48" stroke, Drums 8' diameter, Wellman Friction Clutch for high speed and high pressure. Several Air Compressors from 100 feet to 1,100 feet per minute. Whole of the above plant, second hand, but in fine condition, recommended. Enquiries solicited for all kinds of Mining, Contractor's and Works Plant. Very large stocks for immediate delivery, low prices. Wagons, Rolling stock of every description. **JOHN F. WAKE, Geneva Engineering Works, Darlington, England.**

THE WEEK IN THE SHAREMARKET.

Slightly Easier on Balkan News—Few Shares Offering.

NATURALLY the crisis in the Balkans has had a restricting effect on business in the sharemarket, though in the absence of any pressure to sell, quotations have not suffered much. Until the situation clears in the "Near East," we cannot expect much activity in the market, though in view of the excellent monthly returns from the mines and the good labour position, prices should remain steady. Put in a nutshell, the position is that the intrinsic merits of Rand shares are daily improving and prices are only prevented from responding by the world-conflict which now threatens to involve almost all the nations of Europe.

	Thurs. 30th.	Fri. 1st.	Sat. 2nd.	Tues. 5th.	Wed. 6th.	Thurs 7th.
Adair-Ushers	0 5*	0 3*	0 3*	—	—	—
African Farms	7 4*	7 3*	7 3*	7 3	7 2	6 9*
Apex Mines	16 9*	16 9*	16 9*	16 9	16 7½	16 6
Aurora Wests	8 0*	—	8 0*	8 0*	—	—
Bantjes Cons.	6 0*	6 0*	6 3*	6 0*	—	6 3†
Blaawbosch Diamonds	—	—	—	41 0*	—	—
Brakpan Mines	60 0*	60 0	61 0	60 3*	60 0*	60 0†
Breyten Collieries	21 0*	21 0*	21 0*	—	—	—
Brick and Potteries	5 0*	5 0*	5 0*	5 0*	5 0*	—
British South Africa	—	—	—	10 0†	—	—
Bushveld Tins	—	0 6†	0 5†	0 3†	0 3†	0 3†
Cassel Coals	18 9*	21 0†	19 0*	19 0*	19 0*	19 0*
City and Suburbans	42 0*	42 6*	42 6	42* 0*	42 0*	42 0
City Deeps	61 0*	—	62 6*	62 0*	62 0*	61 6*
Cloverfield Mines	5 7*	5 7*	—	5 5	5 3*	5 3*
Clydesdale Collieries	12 0*	—	12 0*	12 0*	12 0*	—
Cons. Gold Fields	24 0†	24 0†	—	—	—	—
Cons. Investment	16 0†	16 0†	16 0†	15 6†	15 6†	14 6*
Cons. Langlaagtes	—	—	—	36 6*	36 3*	37 0*
Cons. Main Reefs	19 0	18 9*	19 0	18 9*	18 9*	18 9
Cons. Mines Selection	9 3*	9 3*	9 3*	—	9 3*	—
Coronation Collieries	26 6†	—	25 0*	26 0	—	25 0*
Coronation Freeholds	—	—	0 4†	—	—	—
Crown Diamonds	—	—	—	—	—	1 0*
Crown Mines Debentures	£98*	£98*	£98*	£98*	£98*	£98*
East Rand Centrals	2 10*	2 9*	2 9*	—	2 6*	3 0†
East Rand Coals	1 10*	1 10*	1 11*	1 11	2 0	1 10*
East Rand Deeps	1 3*	1 4*	1 3*	1 3*	1 3*	1 3*
East Rand Props.	22 0	21 0*	21 0*	21 3*	21 3*	21 3*
East Rand Debentures	£85*	£85*	£85*	£85*	£85*	£85*
Eastern Gold Mines	1 3*	1 3*	1 3*	1 3*	1 3*	1 3*
Ferreira Deeps	—	36 6	—	—	—	—
Frank Smith Diamonds	1 3*	1 3*	1 2*	1 3	1 0*	1 0*
Geduld Props.	33 3	32 6	33 9	32 6	32 6	31 6*
Glencairns	2 1*	2 1*	—	2 0*	—	2 0*
Government Areas	24 6*	24 6	24 6	24 0	23 9*	23 6*
Jupiters	6 0*	—	—	—	6 9†	—
Kaalfontein Diamonds	—	—	0 3†	—	—	—
Klerksdorp Props.	1 6*	1 6*	1 9†	1 6	1 9†	1 6†
Knight Centrals	10 10	10 6	10 1*	10 0	9 8*	9 3*
Knights Deeps	—	—	—	24 0†	—	—
Lace Props.	3 6*	—	3 9†	3 3*	3 3*	3 3*
Luipaardsvlei Estates	7 6*	7 6*	7 3	7 3	7 3*	7 0*
Lydenburg Farms	3 11	3 9*	3 10*	3 10*	3 9*	3 7*
Main Reef Wests	7 0*	7 8	7 3	7 6†	6 9*	7 0†
Main Reef West Debs.	—	—	—	—	£67½*	—
Middelvlei Estates	1 0*	1 1*	—	—	—	1 0*
Modderfontein B.	112 6B	111 6*	111 6*	110 0*	110 0*	105 0*
Modder Deep Levels	96 6*	96 6*	97 0A	96 0*	96 0*	95 0*
New Boksburgs	0 10*	0 10*	0 10*	0 10*	—	0 10*
New Eland Diamonds	5 0*	16 0†	—	10 0†	10 0†	5 0*
New Era Cons.	6 9*	6 9*	6 9*	6 9	6 9*	6 9*
New Geduld Deeps	2 5*	2 4*	2 4*	2 4*	2 4*	2 4*
New Gochs	13 6*	13 6*	13 6*	—	13 6*	—
New Heriots	57 6*	—	—	—	—	—
New Kleinfonteins	23 9	23 6*	23 6*	23 6	23 6	22 0*
New Modderfonteins	317 6*	317 6*	318 9†	310 0*	308 0*	—
New Primrose	8 0*	—	8 0*	—	—	8 0*
New Rietfonteins	0 3*	—	0 6†	—	—	—
New Unifieds	16 6*	16 0*	17 0†	17 0†	—	—
Pretoria Cements	—	—	—	42 6*	42 6*	42 6*
Princess Estates	2 9*	2 9*	—	2 9*	2 9*	—
Rand Klips	4 0*	3 11*	3 10*	3 11	3 9*	3 9*
Rand Nucleus	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps	2 9*	2 9*	—	—	2 9*	2 6*
Randfontein Estates	—	13 0*	—	12 9*	12 9*	12 6*
Robinson Deeps	—	20 0*	—	—	—	—
Rooiberg Minerals	15 0†	15 0†	15 0†	—	15 0†	15 0†
Roodepoort Uniteds	3 0*	3 0*	2 6*	2 6*	3 6†	—
Ryan Nigels	2 6*	—	—	—	—	—
Shebas	2 3†	2 3†	—	—	2 3†	2 0*
Simmer Deeps	—	—	1 7*	1 0*	2 0†	—
S.A. Breweries	31 0*	32 6†	31 0	30 0*	31 0	31 0*
S.A. Lands	2 7*	2 7*	2 6*	2 9†	2 9†	2 8*
Springs Mines	25 0*	24 6	24 6*	24 6*	24 9*	24 6*
Sub Nigels	10 6*	10 0*	—	—	10 0*	10 0*
Transvaal Coal Trust	37 0*	37 6*	37 6*	38 3	—	37 6*
Transvaal G.M. Estates	28 6*	—	25 9*	26 3		—
Van Ryn Deeps	50 6*	51 0*	51 0*	50 9*	50 3*	50 0
Village Deeps	—	35 0†	35 0†	33 6*	—	35 0†
Vogel Cons. Deeps	0 8*	—	0 9*	0 8*	—	0 8*
West Rand Cons.	—	—	—	—	5 0*	6 6*
Western Rand Estates	—	—	—	—	1 6†	—
Witwatersrands	50 0*	50 0*		—	—	—
Witwatersrand Deeps	26 9*	26 6*	26 9	27 0	26 6*	27 0
Wolhuters	12 0†	12 3†	—	12 3†	12 0*	12 0
Zaaiplaats Tins	14 6	14 6*	15 0*	14 6*	15 0	15 0†

A Ex London. B Odd lots. * Buyers. †Sellers.

A Ex London. B Odd lots. * Buyers. †Sellers.

WRIGHT'S ROPES.

PERSONAL.

The Steel Company of Canada—the most important group of steel product manufacturers in the Dominion—is now directly represented in South Africa by Messrs. W. C. Airey and Company, Ltd. Johannesburg offices have been secured at 49-50, Sacke's Buildings, and are in charge of Mr. B. C. Myers, who until proceeding on service in November last, acted as Kimberley representative of several leading Johannesburg firms. At the present time, Canada is in an exceptionally good position to compete with the United States for the South African trade, both the Customs Tariff and rate of exchange being in her favour.

Pittsburgh Steel Company
Pittsburgh, Pennsylvania
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MANUFACTURERS OF
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Wire Rods, Galvanized Wire, Bright and Annealed Wire, Varnished Wire, Galvanized Barbed Wire, Nail, Bolt and Rivet Wire, Wire Nails, Fence Staples, Fabricated Stock, Poultry and Lawn Fencing

Pig Iron, Blooms, Billets, Hard Spring Coil Wire, Twisted Cable Wire, Telephone Wire, Bale Ties, Steel Hoops, Steel Bands, Cotton Ties

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Mine Safety, Sanitation, and Welfare Bulletin.

MINE MANAGERS' VIEWS ON SAFETY IN MINING.

PUBLIC hearings to consider mine safety rules were held in San Francisco recently, on the initiative of the Industrial Accident Commission and the U.S. Bureau of Mines, the latter being represented by Mr. H. M. Wolflin, who had recently made a tour of the mines of California. In the course of the discussion, upon the phrasing of these rules, the mine managers present contributed a good deal of information of practical importance. We have selected such portions of the record as seem likely to be useful to our readers. The factor of safety in the strength of hoisting ropes provoked a long discussion. In the tentative rules the factor of 5 was adopted, but an increase to 8 was suggested. The lower margin is that adopted by rope manufacturers; the higher one would entail expensive changes and enormous inconvenience to the owners of mines. One veteran engineer said: "Increasing the factor of safety of ropes from 5 to 8 will involve a large expense. The factor of safety of 5 has been the custom so long that hoisting-engines are designed for ropes of this strength. In many cases changing the factor of safety will mean changing the drums in order to put on larger ropes, and in the case of deep shafts it will increase the weight of the rope to such an extent that the capacity of the engine will be cut in two, making it impossible to hoist the ore necessary to keep the mills going without buying an entirely new hoisting-engine. If you will figure out the size of rope necessary for, say, a 4-ton net load, weight of skip 5,000 lb. and 5,000 ft. of rope; for the factor of safety of 8, you will find that the the weight of the rope increases so fast that it is impossible to comply with the rule. This is taking the breaking-strain as given in the tables for plow-steel hoisting-rope." Another manager said: "Hoisting drums in the Lake Superior country, where they have shafts 5,000 ft. deep, could not possibly operate under a factor of safety of 8. The Red Jacket shaft, which is 4,900 ft. deep, handles about 17 tons dead load, that is, the weight of the rope and skip. It has $1\frac{1}{2}$ in. rope with a breaking strain of about 100 tons. That is a fraction over the safety factor of 5. They have had no accidents in their shafts due to the breakage of ropes there since the deep shafts have been put into use. There are 4 shafts deeper than 3,000 ft., 3 shafts over 4,000 ft., and 2 over 5,000 ft. At the Sacramento shaft of the Copper Queen mine, a net load of 13,000 lb. is hoisted on a 4,400 lb. rope made of $1\frac{1}{4}$ in. crucible-cast steel. This gives about $8\frac{1}{2}$ tons dead load; a $1\frac{1}{4}$ in. rope has a breaking strain of 47 tons, so they are operating at a fraction over the safety factor of 5." Several experienced managers testified that they had been operating for long terms of years under the lower factor (5) without any breakage of the rope. Reference was made to Hans Behr's paper on deep winding on the Rand and he was quoted as saying that the factor of safety in force would limit operations to a vertical depth of 5,500 feet, because the weight of the cable would become unmanageable. In specifying for the new electric hoist to be erected at the Plymouth mine, a factor of 7 has been given. It was suggested that the time of service of the rope should be considered; that any rope is seldom in use for more than 18 months; and that if inspected carefully and frequently a factor of safety is introduced thereby. The provision of overhead bars for giving men on cages an easy and secure handhold was adopted. But the forbidding of men standing on the top of a skip, or on the bale, raised a protest. One engineer insisted that "in an inclined shaft the best place to ride is to sit on the bale and put your feet on the lip." That the placing of boards on the top of skips is a common practice and one devoid of danger, was urged by more than one manager. To this it was retorted that it was inconsistent with the effort to enforce the rule providing for enclosed cages in shafts. Whereupon another engineer suggested that the regulation should limit the number of men rather than prevent anybody from riding on the boards properly laid on top of the skip. The limitations proposed was one-half the total capacity of the skip. This would allow skip-tenders, shift bosses, superintendents, and the like, to ride up and down without having to attach the enclosure that is used while changing shifts. The regulation that a man must stand on the skip when giving the signal aroused objection. If the bell-rope broke, the man might fall into the shaft. If it broke before the signal was completed, the man might be hoisted on to the dump. However, he can ring three before he gets into the skip, and then he rings one. The bell-cord system is yet largely in vogue in the West, although the electric-light method is displacing it. The telephone system, which is still better, is gaining ground over both the others. On the whole, the objection to this regulation missed fire. In regard to ladders, it was agreed that the rungs should be at intervals not to exceed 14 inches and that the permissible variation should be one inch. A space of 3 inches between the rung and the wall or timber behind the ladder was accepted as convenient, the ladders being made usually of 2 by 4-in. stringers countersunk for either the whole or a portion of a 1 by 3 or 4-inch piece. To prevent the making of dust in drilling, a regulation was drafted for the compulsory use of a water-jet spray instead of respirators. Objection was raised. It was stated that "the miners will not use the spray that is provided." They will use the respirators to prevent themselves from inhaling the dust, but not the sprays that stop the creation of dust. The Bureau of Mines representative agreed in part but stated that where drills with hollow steel (the water being forced through the steel) are provided, there seems to have been some success in getting the men to use them. In Government work it has been found quite as difficult to get the men to use respirators which are uncomfortable, as to use the dust laying devices. The extra cost of using the type of drill mentioned was asserted to be "at least seven times" that of the "stoper" used in most of the California gold mines. The necessity for employing a bar or column with the hollow-drill type makes its use much less flexible. To this one of the managers replied thus: "We tried to use the water-spray with the hammer stoper, and the men threw it away. We also tried to introduce the respirator. Some used it and some did not. Our particular conditions, at Grass Valley, make the Water-Leyner type of drill the most efficient because it is better for us to mount the machine on a column than to use the hammer-stoper. We also found the Water-Leyner machine is more expensive to operate per shift. It costs us about 6.25 dollars per shift to operate a No. 8 Leyner as against 3 dollars per shift to operate the hammer-stoper. But as we have a flat-dipping vein, the stoping conditions make the Water-Leyner type of machine the best for our purpose. We have had no luck at all with the water-spray, and very little with the respirator." Another manager replied: "This rule more than any other threatens the future of the mining industry. It practically forbids the use of the stoping-drill, the most efficient rock-breaking machine under some conditions that has ever been built. Dust is unpleasant to work in, and if the rock is highly silicious it is unquestionably injurious to health; but respirators can be made, and are made, that will absolutely prevent any dust passing into the lungs. A rule compelling the men to wear such respirators will have the effect which the Commission desires to accomplish in protecting health, without inflicting a burden on the mining industry, that in some cases will threaten its existence. In regard to the respirators, we have some dusty places in the mine, and the men for a number of years past have been buying and using respirators of their own accord. We never made any regulation about it or even suggested their use. They buy them and use them and are perfectly satisfied. Another difficulty and expense is the use of water. In many cases it is difficult to have water piped into the stopes. You have to have a second pipe-line that has to be taken out every time there is blasting, which means double operations in getting ready. Another objection to the column type of drill, either with water or not, is in the placing of it. This operation requires half an hour to an hour and one-half, depending on the character of the place, whereas the stoper can usually be set up in a few minutes. It is extremely efficient in hard ground, and has made, I believe, the fastest drilling record. Compared with the others, the labour is quite high, and it requires a better type of miner to operate efficiently than any other kind of machine. We have been testing these machines recently, and I think I do not exaggerate in stating that if this rule is passed, the use of the respirator prohibited and the use of water-spray made obligatory, it will threaten the existence of the mines on the Mother Lode." To this the representative of the Bureau of Mines replied: "In mines where the stoper is used the ground is very hard and they have discarded all piston-drills or will discard them as far as possible in favour of the Leyner. In stoping with this form of machine, while not always possible with the present construction of the machine to use it economically in California mines, it is possible under some conditions to use it more economically than the hammer-stoper. The Homestake Mining Co. has made extensive tests and has decided to use the Leyner drill because it is more economical. In regard to the hammer-drill also, the dust is hard on the men. I have seen surgeons of the Bureau of Mines examine men who were working in dry mines with these hammer-drills and find evidence of silicosis in over 35 per cent. of the men examined, that is, one man out of every three was affected. The respirators, while they will answer the purpose, if worn, are very uncomfortable, for I have tried to wear them myself over periods of several months and know what the discomfort is. Furthermore, if some reasonable dust regulation is not made at the present time, I think it likely that a more drastic regulation will be introduced at the next Legislature, and we cannot at that time stand between the operators and the men." Many managers testified that the men would not use the spray, while some of them would use the respirators. Another manager made this appeal to the Commission: "We have tried and made some elaborate tests on hollow-steel drills. On account of the hard rock we found the cost of stoping absolutely prohibitive. If it is necessary for us to put in the hollow-steel drills, it will mean closing-down as soon as the law goes into effect. While it will not work much of a hardship on the company, it will on the community." In the end the rule was modified allowing of "other means equally efficient to prevent the inhalation of dust." The respirator won. Objection was taken to the use of the canvas stretcher, especially where an injured man is to be carried down a raise or manway of small size. Instead, the managers approved a wooden stretcher, provided with straps to go around the body, a foot-rest, and an iron hook at the top whereby the stretcher with the injured man firmly attached can be suspended and easily lowered through any vertical opening. The main part is a board about 12 to 14 inches wide. Any carpenter can make it. The Homestake mine supplied the model.

(*To be continued.*)

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

New War Conditions and Elections Create Nervousness—Diamond Drills for Coal Prospecting—Further Drop in Galvanised Iron—Wire Nails Cheaper.

Business did not practically recommence until Wednesday, as the public holiday of Monday pretty well extended itself over Tuesday. This being the commencement of the month, there were the usual monthly enquiries, but very little business resulted. Whilst political and war questions may not interfere with the smooth running of the mines, yet any outstanding bad feature depresses the general run of trade. The Balkan affairs have been seriously discussed, as the possibilities are great and, possibly, disturbing for the commercial world in the immediate future. Then again there are the elections, and the unseemly disturbances at the meetings, which create distrust for anything like new enterprises, therefore the idea is to wait, which is a sensible one, as any nervousness will be removed within a fortnight. All this upsets financial affairs, and, in addition, the farmers cannot command funds on account of the low price of mealies, and even at the recognised daily quotations, the market is anything but a free dealing one. Hence a check in the purchasing of agricultural implements, unless on long credits, and although up-to-date machinery is in plenty in Johannesburg, yet the ordinary buyers are holding off until another season, or rather until there is something like a free outlet for the mealies. The people who are really busy are decorators. The fair weather has created a burst of house repairs, painting and general furbishing, only very occasionally to be seen of late in Johannesburg. The fact is that the housewife does not wish to put off the painting and papering, as everything has to be finished well before Christmas, and the fine weather is an important factor, as the lady referred to does not like workmen about the house with muddy feet, and so forth. The paint and sundries market report says that, contrary to expectation linseed oil has recently advanced in Britain, and therefore will be dearer here in about three weeks' time; the same cable advice, however, states that white lead remains unchanged. Locally the following increases will take place on Friday, the 15th instant. Turpentine, 1s. per case; steps, pole ladders, and extension ladders, 10 per cent. advance; red oxide in oils will be 27s. 6d. per 100 lbs.; purple ditto, 32s. 6d.; zinc, white, in oil, to 90s. per 100 lbs.; and carbolineum will be up by 6d. per O.M. gallon. Wallpapers, as intimated previously were jumped up 20 per cent. on pre-war rates on October 1st, which is the first local advance during the war period, on account of the heavy stocks originally held in Johannesburg. Now these have been pretty well absorbed, and others coming forward at a total advance of 33⅓ per cent. paid to the British makers, the position was such that Johannesburg merchants had no option but to advance their rates.

Iron, Steel, Galvanised Goods, etc.

There is no alteration in the price of iron and steel, but galvanised iron has dropped as low as 7¼d. per foot, which is a reflex from the oversea price. However, the real reason for another local drop is that large consignments are expected at the coast any day, and as there are very fair stocks in the country, holders are selling at a slight sacrifice when an opportunity serves. The stocks of wire nails have accumulated from time to time, and as they still come fairly regularly from America and Canada, as well as Britain occasionally, the price has dropped 5s. per 100 lbs. There is a great scarcity of drill hammers, and the quotation is only nominal, but the difficulty is not a question of price but of obtaining supplies, which are being picked up from almost unexpected quarters to supply the urgent needs to complete mining orders.

Bricks, Cement, and Lime.

Although cement is still scarce, yet it seems a little freer as the South African makers are catching up their overdue deliveries. The price for small lots is often threepence per bag dearer on the standard quotation of 8s. 3d. Similar remarks very much apply to lime, especially the blue hydraulic, for which the demand is still increasing, as a substitute for cement for the less important works. Like most other commercial articles there is a second quality, which is quoted at 2s. 9d. per bag of 160 lbs., as compared with 3s. 3d. for the best. The demand for ordinary building bricks has eased, also there has been a slackening off for the best glazed drain pipes throughout the country. It is difficult to find an explanation for this, the only one given so far is the troubled feeling caused by the elections. However, quite optimistic hopes prevail for a better demand for building material, pipes, etc., before the month closes. Glazed and salt glaze bricks are being made again and are expected to be ready in another four weeks. In connection with building stone, quite a substantial industry has been established at Rietfontein, where rough and dressed granite is supplied direct from the quarries. Quotations are not available until the plans of the buildings are given as a guide. The following are some of the principal items:—Coping stones, base stones, pillars, steps, sills, lentils, and coigns.

Electrical Goods and Small Motors.

Pure rubber flex is quite plentiful again, and the price has dropped a penny, to 5d. per yard. Both 3/22 and 3/30 wiring are getting scarce, and no immediate relief is expected. All cables and wirings have a tendency to advance in price, but so far not sufficient to check tendency for small jobs, many of which are in evidence for private dwellings. Porcelain cleats are quite unobtainable, and no news of fresh supplies can be ascertained. The different manufacturers are freely introducing small motors for all kinds of work, such as grinding coffee, making sausages, carpenters' machinery, and similar work. The farmers and others in the country have to purchase oil motors, of which there are good assorted stocks in Johannesburg ranging from 1 h.p. to 10 h.p. The smallest sizes can be easily conveyed in a hand truck, whilst the larger sizes are fixed on wheels which makes a sufficiently solid foundation for all ordinary farm purposes. These are invaluable machines for the farmers, and it is an industry that is bound to enlarge year by year.

Second-hand Goods.

The chief feature is the supplying of two second-hand diamond drills for prospecting purposes for coal, in the Piet Retief district, as well as at Breyten. Generally the second-hand material trade is dull. A single boiler was sold to a laundry and an engine and boiler to a bone-crushing establishment near town. Building materials of every description are working off very slowly indeed.

Cables:
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METAL RESIDUES *and* SCRAP.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; mild steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in., 6d. per lb.; ½ in. up to 2 in., 37s. 6d.; 6 in., 35s.; over 6 in., 32s. 6d.; ⅝ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 35s.; over, 32s. 6d.; ¾ in. up to 2½ in., 30s.; over, 29s.; ⅞ in. and 1 in., 29s., all per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 40s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, antifriction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7¼d. to 7¾d., 11 ft. 8¼d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6d., 9 ft. 6¼d., 10 ft. 6½d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 3d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9½d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 32s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 21s. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d., per 100 lbs.; turps., 42s. 6d. 2/5 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 11s. 11d. 2/5; petrol, 22s. 2/5; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb, according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 4s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; radiator lamps, 4s. 6d. each; double pure rubber flex, 5d. per yd.; 3/20 coils of wire, 27s. 6d., do., 3/22, 23s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

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Engineering Notes and News.

THE TREND OF ELECTRICAL DEVELOPMENT.—II.

Mr. Paul M. Lincoln, continuing his presidential address to the American Institute of Electrical Engineers, says that one of the most pressing of our existing limitations to a reduction in cost of electrical apparatus is that fixed by temperature rise. The output of a piece of electrical apparatus increases with the temperature rise, and the temperature rise in turn is dictated by the point of balance between the rate at which heat is put in and that at which it is taken out. The rate at which heat is put in depends largely upon physical characteristics which are already being crowded to the limit by our modern designs. The rate at which heat is dissipated depends upon the efficiency of the ventilation methods used, and in this particular there is a considerable opportunity for improvement. The methods and devices for taking heat out of machines are just as important, when considering the temperature rise, as the prevention of heat from entering. The additional costs of applying the more efficient methods of dissipating heat will go far towards multiplying their tendency towards a reduction of cost. However, there is one line of development that does promise some reduction in cost, and that is the tendency toward higher operating temperatures. In the past, the maximum operating temperature has been fixed by the disintegrating point of fibrous insulation, and this point has placed a very definite and logical limit to temperature rises in such machines. However, when types of insulation are used which do not have this definite temperature of disintegration, this reason for such a temperature limit disappears. Just how far we can go without exceeding the safe limits is at yet problematical; however, a limit to an indefinite extension in this direction is set by the temperature coefficient of copper conductors, the property that causes the resistance to rise with increasing temperature, thereby causing still higher losses, and in turn still higher temperatures. If we go high enough, we reach a point of unstable equilibrium in this temperature rise curve, where the apparatus will literally and automatically "burn out." This point is, of course, far above anything that is projected at the present time. In the matter of power production, therefore, although we have steadily improved in the past, both as to costs and as to performance, and although we may expect to continue this steady improvement in the future, we can see ahead of us a definite limit beyond which it will be impossible to improve the methods of power production now in use. So long as we continue to get our power from falling streams and burning coal, we need not expect to see the same radical improvements in the future as have distinguished the past. The revolutionary improvements in power production methods of the future must come in a fundamental change of method rather than in the continued improvement of existing methods. In the matter of utilisation of power a few comparisons with the past may not be amiss. The progress of the future will undoubtedly come from improvements in methods of application, and in this direction the field is inexhaustible. For instance, the problem of applying electrically the large amounts of power which are demanded by our modern railroad trains has not yet received a solution which is satisfactory to all concerned. The devising of methods for the application of electricity to our modern industries constitutes the occupation of no small part of our fraternity; it is along this line that we may expect much of what the future may have to offer us of a revolutionary character. After the telegraph, in point of time, the electric light was the first practical application of electricity. Most of our modern development in electrical engineering has taken its initiative from the supply of electric lighting to our communities. Kennelly in his 1898 address said, "The price of a 16-c.p. incandescent lamp 16 years ago was about $1.00. Now it is about 18 cents. The best lamps at that time, under laboratory conditions, gave about 0·28 mean horizontal British candle-power per watt, and under commercial conditions about 0·20. The highest pressure for which they could then be obtained was about 110 volts. At the present time lamps are obtainable giving normally 0·4 mean horizontal British candles per watt, while under commercial conditions the average lamp normally develops about 0·25 candle per watt. They can also be obtained (at 0·25 candle per watt) for pressures up to 240 volts, and are frequently installed on 220-volt mains." The introduction of the metal-filament lamp has enabled us to-day to record a much greater rate of improvement in efficiency than Kennelly did. He reported an improvement of about 50 per cent. in efficiency in the 16 years previous to 1898. In the 17 years since Kennelly wrote, we have improved our maximum efficiency about 1,000 per cent., an advance which is truly marvellous. But here is a field where we have a long way to go yet without reaching a possible limit. It is true that the melting point of the now available materials seems to place the limit of lamp efficiency at a point not much higher than that which we have at present. However, when we come to compare efficiencies of even our best lamps with that attained by the fire-fly it is evident that we still have a long way to go before we have reached perfection. In the matter of power transmission, progress during the past few years has been remarkable. In 1898 the record reads:—"The electric transmission of the power of falling water is a branch of engineering that has come into service since 1884, and is making rapid strides, owing to the recent successful employment of high voltages and multi-phase alternating currents. It has been estimated that about 150,000 kw. of this class

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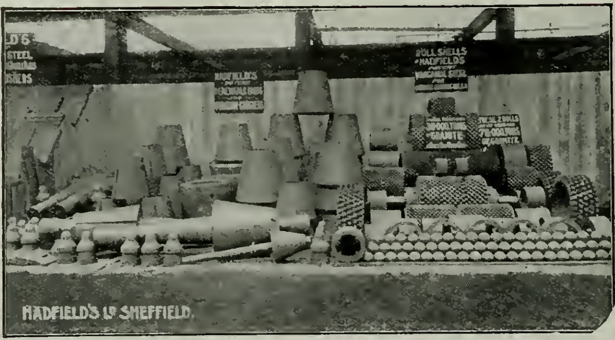

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of machinery is installed in the North American continent, commercially transmitting power to various distances up to 85 miles, at various pressures up to 40,000 volts." Since Kennelly wrote, 17 years ago, the maximum transmission voltages have gone up about three and three-quarter times; the maximum then was 40,000, and now is 150,000 volts. The maximum distance of transmission has gone up about three and a half times, 245 miles as against 85, and the installed capacity of water power plants on the North American continent about nine times, 1,350,000 instead of 150,000 kw. Kennelly also mentions in his record that " insulation testing sets have been made for producing alternating pressures up to 160,000 volts effective." In this respect we can go at least 10 times better than he reported, 1,000,000 volts from transformers having been made available on more than one occasion, and in some cases the voltage available from transformers has been pushed even higher. This matter of power transmission has advanced with probably greater rapidity than in any other branch, but we are approaching some fairly well-defined limits in these matters. For instance, in the question of increasing transmission voltages we are close to the corona limit. There are, of course, methods of increasing the voltage range somewhat before corona is produced, such as increasing conductor diameter, but it can be readily seen that the limits of such remedies will be reached long before transmission voltages have increased by the same ratio as they have in the past 17 years. Another limit that we are approaching in the matter of power transmission is the economic one. There obviously is a limit to the investment that can be made in transmission lines, and still be able to supply power with the same economy as it can be generated upon the ground. This consideration, coupled with the rapid advance in methods of generating power from steam, has placed an economic limit to the transmission of water power, so that we cannot expect any such advances in the future as the past 10 or 15 years have given us. Transmission by high-voltage direct currents has received some attention of recent years. While there is no question but that the problems of pure transmission are much simplified by the use of direct currents, the accompanying problems of the generation and utilisation are so much intensified that nothing is to be gained in this manner. Probably no material advance will be made in direct-current transmission unless some means, as yet undeveloped, is found by which its generation and utilisation are made easier and safer than is possible at present. Electricity is no longer the infant that it was formerly pictured, and cannot be expected to continue the rate of growth of the infant. It is attaining the vigour and strength of manhood. It is contrary to natural law that either a child or an industry can have rapidity of growth and at the same time strength and stability of character. Unquestionably the rapidity of our development is not so great now as it was when Kennelly spoke in 1898, and in this respect we are but following a natural law. At the same time, our vocation is acquiring a stability and performance that are absolutely incompatible with the rate of growth that characterised our earlier years.

Municipal Insurance.

We have received a booklet dealing with the suggestion of a South African municipal insurance fund, a project set on foot in April last by means of a circular to the municipal authorities in South Africa with a population of over 2,000. Mr. Stride, the originator, wrote:—I should be obliged if you would favour me with your views on the subject of establishing a South Africa Municipal Insurance Fund, with the following objects: (a) Of insuring against loss or damage by fire the property of municipalities within the Union. (b) Of co-operating herein, if mutually desired, with the Union and Provincial Governments. (c) Of meeting other insurances for municipalities (workmen's compensation, fidelity, live stock insurance, etc.). (d) Of extending at the earliest date the scope of the fund to include private fire risks throughout the Union. The great advantage of carrying out the proposal would be the retention within the Union of the large sum which is being sent out of the country annually, and this would facilitate the issue from time to time within the Union of Government and Municipal loans. Several of the municipalities of course already have their own Third Party (Accident), Live Stock, Employers' Liability and Workmen's Compensation Insurance Funds. The cost of administering these funds is infinitesimal. The following figures for 1912, giving the fire experience of 54 companies carrying on business in the United Kingdom, are of interest:—

	Amount.	Ratio per cent.
Premium Income	£34,212,297	100
Losses	17,722,207	51·80
Commission and Expenses ...	12,583,377	36·78
Profit	3,906,713	11·42
Total	£34,212,297	100·00

The administration of the proposed fund could be carried out inexpensively by one of the large municipalities to be selected. It will be noticed that with the 54 companies above referred to an undue proportion of the premium income (36·78 per cent.) is absorbed in expenses of management. In the event of the fund being extended to cover private risks the payment of agents' commission would necessarily increase the ratio of expenses above the low rate which would obtain in the case of municipal risks only. The municipality selected would need to be responsible for the proper administration of the fund, and the fund could be subject to audit by the Union Controller and Auditor-General in the event of the Government participating. It might be a principle of the fund that the rates for each town would be dependent upon the town's fire experience. The objection usually offered against the establishment of a Municipal Fire Insurance Fund is that a heavy loss or losses incurred within a few years of the inception of the fund would exceed or cripple its resources. Having regard, however, to the financial position of the municipalities within the Union of South Africa there appear to be no difficulty in guaranteeing the stability of the fund even if only a few municipalities combine. If the figures in respect of the following seven municipalities only, viz., Capetown, Johannesburg, Durban, East London, Bloemfontein, Pietermaritzburg, and Pretoria, be taken, it will be found that the excess of their assets over liabilities amounts in the aggregate to nearly £9,000,000.

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NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 2d.

CONTENTS.

PAGE
Notes and News 147
Topics of the Week:
  The General Election and Miners' Phthisis 149
  The Campaign Against Mine Accidents 150
Mining Activity in the Pilgrims Rest District 151
The Year with the Main Reef West 152
The Truth About Miners' Phthisis 153
Economics and the War 155
Rock Drills in Use on the Rand 156
A Review of the Diamond Trade 156
A Year of Mine Native Recruiting 158
Water Supply of the Rand—X. 159
Metallurgical Practice on the Rand—VIII. 160
Stoping Methods and Drilling Problems on the Witwatersrand—IV. 161
The September Output in Detail 163
The Week in the Mining Material and Engineering Trades 167
The Week's Meetings: Native Recruiting Corporation 169
Engineering Notes and News:
  A New Self-Lubricating Roller 170
  Preparation of Large-Type Boilers for Test—I. ... 170

Notes and News.

S.A. Institution of Engineers.

The monthly meeting of the S.A. Institution of Engineers, held last Saturday night, produced an interesting paper by Mr. H. Martin on boiler tests, an extract from which appears in this issue. Mr. H. Stuart Martin was accorded a vote of thanks for his recent valuable paper on the lay-out of the Modder B., which he gracefully acknowledged, coupling with his thanks, however, an expression of regret that the paper had not evoked more discussion. Mr. E. J. Laschinger read a short contribution on Mr. H. Stuart Martin's paper, and the discussion will be concluded at the next monthly meeting. With the discussion on accidents, which brought the meeting to a close, we deal elsewhere.

* * * *

The Clifford Passes.

The Clifford G.M. Co., Ltd., has gone into voluntary liquidation. It will be remembered that the company was formed some time ago to take over the property formerly known as the French Bobs, in the Barberton district. The plant was of the most modern description. The reason why the Clifford has failed has not been disclosed.

* * * *

The Australian Mining Industry.

The unshackling of the Australian mining industry from German control has been given a decided impetus by the decision of the British Court in connection with the Zinc Corporation, which, together with the legislation already passed by the Commonwealth and the States, annual contracts with the enemy. It is now considered that the way is open for a complete readjustment, which will eliminate German influence for all time.

* * * *

Nigel may Suspend Crushing.

The returns from the Nigel mine for September are as follows:—Tons milled, 10,500; gold recovered, 3,220 fine ozs.; stamps running, 70; loss, £987. "The cause of the returns being unfavourable," says the secretary, "was given under the heading of 'profit' in the last quarterly report, and there was also short running time during the month owing to necessary repairs to plant. A report has been received from the manager to-day strongly recommending the suspension of milling operations for about six months for the purpose of pushing on development and also saving monthly losses. The Board have the matter under consideration and when a decision has been arrived at shareholders will be advised at once."

* * * *

Apex-Kleinfontein.

In 1914 the Apex Mines, Limited, sold the gold-mining rights under its mynpacht area to the New Kleinfontein G.M. Co., and received 150,000 £1 shares of the latter company. The Apex Company continued its ownership of rights over other area of the farm Rietfontein, also its coal rights. The issued capital of the Apex Mines, Limited, is 300,000 £1 shares. Meetings of the shareholders are to be held on November 19th and December 11th, to deal with a projected distribution of shareholding and reduction of capital as follows: (1) Distribution of the 150,000 Kleinfontein shares by allotting one share per two Apex shares. (2) Reduction of the 300,000 £1 shares of the Apex Company to 10s. each. The present price of Apex £1 shares is 16s. 9d., and that of Kleinfontein £1 shares is 23s. 9d. Two Apex shares, at market price, equal £1 13s. 6d.; deduct one Kleinfontein share, £1 3s. 9d.—9s. 9d. The resultant would be that the new 10s. (reduced) Apex share would have a price of not quite 5s. The following assets were retained by the Company: 1. The coal area, together with equipment for coal-getting. 2. The quarry, plantations, etc. 3. The owners' share of claim licences on the area of the farm (ultimately representing some 4,000 claims), which has not yet been thrown open to pegging. For 1914 the profit from coal getting was returned as £20,530, and sundry revenue £1,250.

Definition of "Enemy."

A Proclamation was published in a special supplement to the *London Gazette* in mail week, defining the meaning of the expression "enemy." It is declared to include, and to have included in previous Proclamations relating to trading with the enemy, "any incorporated company or body of persons (wherever incorporated) carrying on business in an enemy country, or in any territory for the time being in hostile occupation." This official definition is now published to remove doubts which had arisen as respects the position under the Proclamations relating to trading with the enemy, of incorporated companies or bodies of persons, which, though not incorporated in an enemy country or in territory in hostile occupation, carry on business in such country or territory.

* * * *

Kamfersdam Mines.

The report of the Kamfersdam Mines for the twelve months ended June 30, 1915, states that as the mine was closed down early in August last year owing to the war, the accounts only cover practically one month's working, and the loss shown therein (£7,934) arises from fixed charges, such as debenture interest, maintenance and establishment expenses. Debenture interest is now in arrears for more than twelve months; Messrs. Krauss Brothers having also guaranteed the bank ovedraft, amounting to over £15,000, and made advances to meet current expenses here, are now asking for security to cover these amounts. The directors propose to create second debentures up to the amount of £25,000, carrying interest at the rate of 7½ per cent. per annum, and to deposit them with Messrs. Krauss Brothers as security for all amounts due or which may become due to them. Since operations ceased at the mine a fall of reef has taken place, but until a survey is made it is impossible to estimate the quantity; should this prove to be large, it will be a question for serious consideration when work is resumed whether the present system of open working should not be abandoned and shafts sunk so as to adopt underground working in future.

* * * *

Coal for Egypt.

We recently announced that owing to the restriction in the supply of Welsh coal, an experimental shipment of Transvaal coal, viâ Delagoa Bay, to Port Sudan, for the use of the Sudanese Railways, had been made. The Union Railways have loaned their locomotive inspector to assist in the trials. There was a possibility of an extension of shipments to the Egyptian Railways. We now learn that American coal exporters are showing some interest in the Egyptian market, but complaints are being made as to the terms of the specification issued by the Egyptian State Railways and Telegraphs. The contract involves 360,000 metrical tons (354,310 gross tons) of either Welsh or American screened steam coal. Nothing is said about South African. It is provided that Welsh coal must be furnished from certain specified collieries only, and American coal must be suitable for locomotives, to contain about 35 per cent., and not over 40 per cent., volatile, and about 6 per cent. ash—both on the dry basis. Analysis must be submitted with the proposal. Each cargo is to be judged by a sample taken at the loading port by the Administration's inspector. For more than 2 per cent. ash in excess of the percentage established in the contract, 4c. will be deducted for each 1 per cent. or fraction thereof. Two per cent. of the total value must be deposited as "earnest money," this to be increased to 10 per cent. if the tender is accepted. The Administration has the option of increasing any monthly quota up to 30 per cent., or dividing the contract according to a prescribed table, the unit of shipment being 5,000 tons, or one shipload. Guaranteed rate of discharge is to be 700 tons per working day. Contractors are to make all necessary arrangements for payment of freight. American exporters especially "jib" at the strike clause, which gives the right either to cancel the unfilled portion of the contract or to compel the contractor later to make good the deliveries which would otherwise be made were no strike in force; and the power of rejecting cargoes, the deposit, and other requirements as to chartering and payment do not fit in with Transatlantic ideas.

Coal from Somaliland.

A sample of coal, obtained from a locality 53 miles east of Berbera, has been examined at the Imperial Institute. This coal resembles samples from Nigeria, which have already been examined at the Institute, but is not so good as the better qualities of the Nigeria coal. At present (according to a statement in the current number of the *Bulletin of the Imperial Institute*) it can be of value only for local use, but the deposit ought, it is to be pointed out, to be thoroughly examined in order to ascertain the extent and the general quality of the coal, which later on may possibly prove to be of great economic importance. Samples of salt have also been received from Somaliland. These prove to be very similar in composition to most rock salts. Refined salt prepared from them at the Imperial Institute was of good colour, and was not affected by exposure to air, and is declared to be generally suitable for culinary purposes.

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Miners' Phthisis Returns.

The annual returns of the Miners' Phthisis Board for the period August 1, 1914, to July 31, 1915, are detailed in the last issue of the monthly statistics of the Department of Mines and Industries. During the year 1,013 new applications were received under the old Compensation Fund, and 2,064 under the Insurance Fund, to which the men contribute. In addition, there were 739 applications under the old Fund carried forward from the previous year. The cases dealt with during the year are given under the following heads:—Under Compensation Fund: New applications 362, further applications 715, dependents 258; total, 1,335. Under Insurance Fund: New applications 1,561, further applications 75, dependents 74; total, 1,710. Under the Amending Act of 1914 there were 1,103 applications from men who had received only £96, and who claimed the extra £100 to bring them into line with the Amending Act, which raised the compensation for first stage patients from £96 to £200. Of these, 1,072 were dealt with, and awards were made in 1,007 cases. Thirty-one applications remained on hand at the end of July. Under section 6 of the Amending Act, 159 applications were received from widows and other dependents, who also claimed the extra £100—the deceased or absent miners having received only £96. In these cases 98 awards were made, 23 applications were refused, and 38 applications had not been dealt with on July 31. The applications on hand on July 31, under the Compensation and Insurance Funds, are lumped together and explained as follows:—Awaiting proof of underground service, 116; awaiting return of medical adviser's report, 153; awaiting medical adviser's classification of oversea medical reports, nil; awaiting return of oversea medical report, 103; awaiting evidence of dependency, 280; awaiting Board's decision, 89; total, 741. During the year under review 684 applications (including 85 under the heading of "further" applications) were turned down because the doctors certified that the men were neither wholly nor partially incapacitated by miners' phthisis. Altogether 510 "further" applications were turned down because the condition of health on medical re-examination showed no change. The analysis of the country of origin of the beneficiary miners worked out as follows: South Africa, 375; United Kingdom, 676; other European countries, 130; Australia and New Zealand, 64; Canada and United States, 28. The applications received during the year totalled 4,339, including those under the Amending Act.

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Brakpan's Increasing Profit.

The third quarter of the year, viz., that ended September 30, has been the best for the Brakpan Mines this year. The tonnage crushed was 190,300 tons, as compared with 181,010 for the preceding three months. Working costs were a trifle over a penny higher per ton, and the yield per ton was about 7½d. better. The net result was an increase in the working profit from £86,854 for the June quarter to £96,015 for the September quarter. For the first three months of the year the profit was £77,262, so that there has been a steady growth in profits with the progress of the year.

TOPICS OF THE WEEK.

THE GENERAL ELECTIONS AND MINERS' PHTHISIS.

The results of the elections of next week are, of course of vital importance to the mining industry in as far as they affect stability of Government and economic freedom. For this reason all concerned with the industry and the larger number directly or indirectly dependent upon it for a living —and it is difficult to set limits to the latter class—must hope and pray for the defeat next week of disloyalty, Socialism, and the other forces making for reaction, class war and the associated evils whose end is bankruptcy. Apart from the usual vague denunciations of capitalism, —which have lost most of their savour and all their novelty with working-class audiences—and floods of vitriolic abuse of those engaged in the administration of the mining industry, the latter has figured little in the election campaign, except in one respect. Much was made of miners' phthisis, and at one time a concerted effort was put forth by the Labour candidates to make the cry for reform in that respect exclusively their own. Fortunately that attempt proved abortive, owing to the obvious fact that all parties were agreed upon the reconsideration of the whole matter, and that the Labour people could claim no monopoly of interest in the fate of the victims of the disease. Though this shameful attempt to make party capital out of a public calamity failed, miners' phthisis continued to be bandied about at party meetings, the Labour people dishonestly using it as a stick with which to beat their opponents, while the latter betrayed a disheartening lack of acquaintance with the elements of the question. Though naturally the mining industry as an industry could not enter the turgid atmosphere of the political arena, we are glad to see that one of its leaders, Mr. D. Christopherson, has come forward, in his private capacity, to utter a protest and offer a suggestion that will commend itself to all sensible men. Mr. Christopherson, in a letter to the papers, says that in reading the published reports of the speeches of the various candidates seeking the votes of electors at the coming Parliamentary elections, one almost invariably finds opinions expressed, and promises made, as to how the present Miners' Phthisis Act should be amended, "It must have struck anyone," he adds, "who has studied the question how little many of the candidates know of the subject, in fact one feels that some of the speakers can scarcely even have read the Act. When the time comes for such of these candidates as may be successful in the present elections to discuss this important question in the Assembly they should, in justice to themselves and their subject, be in a position to speak with a full knowledge of all its various aspects, more especially as, in their capacities as representatives of Witwatersrand constituencies, they might be expected to be specially conversant with the subject. It is, for instance, important that they should know what steps have been taken to combat the disease. In no single instance have I seen any reference to the greatly improved conditions underground throughout the mines in the way of dust-allaying and ventilation, or to measures taken by the Government Mining Engineer and by those responsible for the management of the mines on the Witwatersrand to endeavour to eliminate this scourge. One can only conclude that candidates really do not know what has been done in this direction."

> "It is equally important," proceeds Mr. Christopherson, "that they should know whether the work done and the money spent has resulted in any reduction of the disease. Published statistics to this effect are admittedly very meagre. The latest official information available on the subject, namely, the last report of the Miners' Phthisis Board dealing with the position up to July, 1914, has only just been published and contains even less information than the report for the previous year. The report gives no statistics of value whatsoever as to what, if any, progress has been made towards stamping out the disease. Even if you apply to the Board for information as to what length of time the men who have received the £200 compensation during the last year have worked underground, you are unable to obtain the information. It is thus impossible to know whether these men have worked only two or ten years before making their claim for the smaller compensation. Several candidates have righly claimed that this is no party question, so might I suggest that those candidates who are elected to represent the Witwatersrand should, immediately after the elections, form themselves into a committee to thoroughly investigate this question, so that they may know their subjects from A to Z when the matter is raised in Parliament. The committee so formed should, I suggest, be irrespective of party and should endeavour to obtain evidence from employers, employees and the various officers who have been working on and studying the subject; they might examine the extent to which it is necessary to have the co-operation of the employees in carrying out the regulations which have been formed to improve dust conditions in underground workings; and they might inspect the underground workings in one or two mines. In addition to the foregoing, they might with advantage consider the importance of the Miners' Phthisis Board furnishing the public with statistics which will go to show whether the endeavours being made to combat this disease are meeting with success or not."

It is to be hoped that Mr. Christopherson's excellent suggestion will be put into force with as little delay as possible, after the elections. And it is to be hoped, likewise, that the hint he gives that somebody should jog the elbow of that egregious body, the Miners' Phthisis Compensation Board, will be acted upon. We have it on the unimpeachable authority of a Labour orator that no public body in Johannesburg is easier to "do down" that the Phthisis Board! This, of course, bears out from an unexpected quarter what we have been saying for years regarding the effect of the oyster-like, secretive methods of that body. Not less, but more, publicity is required in connection with miners' phthisis, and the methods whereby its victims are now compensated. Mr. Christopherson's letter evoked another from Mr. J. W. Quinn, M.L.A., who writes to the papers, *inter alia*, as follows:—

> "Mr. Christopherson's interesting letter prompts me publicly to make a suggestion which I have made privately to people who, I thought, would agree with my suggestion, and act on it, although, so far as I know, nothing has yet been done. It is to this effect, that a full statement should be prepared at once giving an account of the steps taken in the mines to combat the scourge of miners' phthisis, and that the people who draw up this statement might go a little further than merely supplying particulars and give their views as to what further could and should be done to eliminate the scourge of miners' phthisis. In several important respects there seems to be a perplexing difference of opinion amongst those who contributed on the subject. Mr. Christopherson seems to chide some of the Parliamentary candidates for want of knowledge or rather for making unwise promises, but is it not somewhat unreasonable, where experts differ so much and the people who could tell the public a great deal about miners' phthisis do not take the trouble to do so, to blame the ordinary candidate for not knowing more about the subject? Surely, it is easily understood that a candidate, faced with an inquisitive audience, anxious perhaps, sometimes above all things, to score off the speaker, may be tempted to get out of his temporary trouble by saying 'Yes,' in answer to questions, the import of which he could not properly appreciate in a moment. Mr. Christopherson points out that 'the latest official information available on the subject, namely, the last report of the Miners' Phthisis Board dealing with the position up to July, 1914, has only just been published and contains even less information than the report of the previous year.' I have read the report and agree fully with what Mr. Christopherson says about it, but just imagine, Sir, sending out a report of this kind which only deals with matters up to July, 1914; that is more than a year behind. I think Mr. Christopherson's proposal is a most excellent one, but it will take a long time before it can be acted upon. In the meantime once more may I say that I hope to get, without delay, some fuller information from those people who have it?"

Mr. Quinn is, perhaps, in his letter a little unfair to the spokesmen of the industry, who have from time to time publicly reviewed the progress of the campaign against the disease; to the Parliamentary Special Committees who have collected and published volumes of information on the subject; and to the Chamber of Mines, which has issued in its periodical reports a vast amount of illuminating data regarding the disease collected by the industry as a whole. In this issue, we reprint extracts from an official statement issued by the Chamber of Mines two years ago, of which a knowledge would have saved many candidates from confusion in the course of recent discussions. The statement traces the history of the evil, and indicates the heroic measures adopted by the industry even two years ago to combat it. To-day, we make bold to say the campaign is being carried on with increased energy and intensity. And it may be hoped that amid the first acts of General Botha's renewed and rejuvenated Government on its triumphant return to power and office next week will be the preparation and issue of the latest statistics reflecting the progress of the fight against miners' phthisis, and an official review of the united efforts of both Government and industry to counter the evil.

THE CAMPAIGN AGAINST MINE ACCIDENTS.

Mr. C. B. Pattrick's paper on "Machinery Accidents on the Mines of the Rand," read before the S.A. Institution of Engineers, evoked an instructive discussion at a recent meeting of that body. A round-table debate on the subject of accidents by some of the leading engineers of the Rand is something of a novelty, and did not fail to provide many points of interest. Thus the President of the Institution, in the course of his remarks, drew aside the veil behind which the Insurance Companies usually hide their premium rates, and mentioned that recently he had been investigating the question of premiums for insurance against accidents, and it was interesting to note how the amount of the premium had fallen during recent years. Five or six years ago the premium was 17s. 6d. per cent., but last year it was only 10s. 6d. per cent.; unfortunately, he added, the company which quoted the latter figure suffered loss, and consequently the premium has been increased for the present year to 12s. 6d. per cent. This showed that when the Workmen's Compensation Act first came into force there was very little information upon which to base their premiums, and high premiums had to be charged to make the position of the companies safe. Mr. E. J. Laschinger made a suggestion of which more is likely to be heard. He said he thought that it was wrong to make the resident engineer personally responsible for machinery accidents to the extent to which the Mining Regulations do. He thought that safety precautions and safety measures should be provided for all kinds of machinery for the prevention of accidents, and the Government should appoint safety engineers, who would be responsible to the Government and say exactly what was required. Their resident engineers had too much responsibility altogether, and it took all their time to see that the wheels turned round and that the month's profits came along regularly. They had as much on their hands as they could manage, and he thought that, although every engineer did his best to prevent accidents, it was a little bit unfair to add the full responsibility for accidents. The suggestion may be commended to the attention of the "Safety First" Committee. Mr. Bernard Price said the question might be divided under two general headings: (1) There was the question of how far engineers, in their best judgment, could prevent accidents by physical means and by the enforcement of safe operating methods. (2) How far the importance of helping himself to safety could be impressed upon an employee. The paper dealt with the first aspect of the question, and the second falls within the province of a "Safety First" campaign and similar propaganda. Mr. Price said he was not competent to speak on the question of mining accidents, but he had considerable experience of electrical accidents, which, in his opinion, formed an important branch of the subject. Mr. Pattrick had pointed out that the initial lay-out of a plant had a very important bearing on the question of accidents. The fact that in electrical working every live conductor operating at a pressure of more than a few volts might constitute a source of danger, rendered it specially necessary to consider questions of safety when designing the lay-out of electrical plant. Many precautions were taken to ensure the safety of workmen and attendants when designing a modern switch-house. Notwithstanding this, however, the conditions were so special that, whatever physical means may be taken for preventing accidents, the safety of operating attendants and of workmen engaged on repairs must be largely dependent on the care which such men themselves exercise. On the system with which Mr. Price was connected, very complete and stringent regulations had been enforced, these regulations entering into much greater detail than those enforced by the Government. The regulations in question were more stringent than those in force on any other power scheme with which he was acquainted, and were, in fact, so complete that it was virtually inconceivable that an accident could occur excepting as a result of a breach of the regulations. It was unfortunately a fact, nevertheless, that the regulations were not always adhered to, and that, as a consequence, accidents did occasionally occur. It would almost seem that those employees who, from the nature of their work, should best realise the risks entailed, were in course of time most likely to become callous and careless. The question was as to how best to ensure compliance with the rules. Suggestions had been made, as, for instance, a system of regular drills or examinations; but the difficulty was that such examinations, whilst proving that the employees had a thorough knowledge of the regulations, did not appear to increase the care exercised by them under ordinary working conditions. It almost seemed, added Mr. Price, as if the example furnished by actual accidents in itself constituted one of the best preventive measures. This was an unsatisfactory position, and it pointed to the importance of the "Safety First" campaign. Mr. Whittome, in the course of some remarks, asked the author, from his long experience, to state whether he thought that a consistent attempt was made by both employer and employee to obey the whole of the regulations. His information showed that in certain directions there was not that serious effort which should be made; he knew of accidents having occurred, some involving fatalities, which might have been avoided had the regulations been observed. One or two references would indicate the class of breach of regulations which he referred to. In the case of all hoists used "for the raising or lowering of persons, or the raising or lowering of material in shafts when persons are working under or below the same," the regulations state that certain inspections must be carried out. In practice, he said, they were not, and many accidents were the result. His reference was not to the main hoists and their ropes—he believed that the inspection of these was properly carried out—but to winches hauling from winzes in the mines, these being as much covered by the regulations as the main hoists. Without fear of contradiction, he would state that one portion of the regulations was systematically broken on at least 90 per cent. of the mines. He referred to the regulations dealing with signals given on the locked-bell system. Another opinion expressed by Mr. Whittome was that the enquiries held by the inspectors were generally closed too soon. Mr. Kenneth Austin declared that a prolific cause of accidents was the fact that details of accidents that had happened were never published. There is much to be said for this plea for publicity, which Mr. Austin elaborated at the subsequent meeting of the Institution, at which his views, however, were marred by some unnecessary personalities. The discussion, however, is still open: and it may be hoped that before it closes the importance of the subject will evoke the views of other engineers.

Natal Coal for the Argentine.

The Natal coal companies apparently do not intend to allow the Transvaal collieries to capture all the trade, and since attention was drawn to the departure of Mr. Henderson for Sudan, in the interests of the Transvaal coal owners, no effort has been spared to secure orders for Natal coal. Whether success has resulted or not it appears that the example of the Transvaal collieries is to be emulated by the Natal coal interests, and the s.s. "Clan Macdougall" has left Durban for Buenos Aires with a cargo of coal on board. The coal is an experimental cargo, and with it goes Mr. James Wilson, of the Glencoe Collieries, who has been deputed to dispose of it, and to endeavour to work up a trade for Natal with the Argentine. Mr. Wilson has a thoroughly practical working acquaintance with the coal from the Natal collieries, and the issue can be safely left in his hands. If the trade can be captured he will leave no stone unturned to ensure that Natal finds the outlet it needs for its coal. Mr. Wilson is expected to be away about two and a half months.

MINING ACTIVITY IN THE PILGRIMS' REST DISTRICT.

Striking Results on a Small Scale—A "Small Man's" Field—Government Attention and Assistance Needed.

According to the August returns of the Mines Department, there were in the Pilgrims Rest district some 15 mines dropping stamps with a total capacity of 154 stamps and six tube mills. The number of tons milled was 25,513, and the value of the gold recovered therefrom £46,946. This gives a return of 36s. 9d. per ton milled, and compares strikingly with the average yield of 26s. 11d. per ton milled on the Witwatersrand during the year 1914. During the months from April 1st, 1914, to December 31st, 1914, the recovery per ton milled at the several mines of the Transvaal Gold Mining Estates, Ltd., averaged 50s. 11·8d., and the profit 28s. 5·5d., the total expenditure for the same period being 21s. 8·9d. per ton milled. During the present year, until August 31st, the recovery was only 46s. 10·7d., and the profit 21s. 10·8d. per ton milled, and the lower results are explained by the fact that the exceptional floods of the earlier part of the year had a most disastrous effect on all mining operations. The expenditure and revenue account of the company for the year ended March 31st, 1915, show that the small battery of only five stamps at the Elandsdrift mine made a working profit for the twelve months amounting to £29,735 10s. 8d., while the total working profit for the year of the Central, Elandsdrift and Vaalhoek mines was no less than £224,920 17s. 11d. A profit of nearly a quarter of a million sterling from 75 stamps throws the magnificent achievements of the Rand well into the shade. The ore reserves of the company at the end of the year under review were estimated at 527,487 tons with an average value of 13·28 dwts. per ton. A decrease of 6 per cent. in the value of the reserves was recorded, as compared with those of the previous year, the reduction of the grade being at the Central mines, near Pilgrims Rest, where a 60-stamp mill and 3 tube mills are in operation, and at Vaalhoek, about 12 miles north of Pilgrims Rest; and recent disclosures, as was stated at the time of the meeting last month, showed no improvement. At Elandsdrift, some 20 miles south of Pilgrims Rest, the values are said to be phenomenal, and an additional five stamps, making 10 stamps in all, is to be erected at this mine. It would be erroneous to suppose that these mills of the Transvaal Gold Mining Estates could be accepted as indicating the possibilities of the Pilgrims Rest district, but taken in conjunction with the figures quoted at the beginning of this article it is clear that the field is one of considerable importance even at the present time.

A Small Man's Gold Field.

There are no returns published which show the monthly yield of the properties just referred to, but if we take it at, say, £30,000 for the month of August, a figure that seems approximately correct, there remain a return of £16,946 as representing the yield from 75 other stamps, or well over £200 per stamp per month! Putting the figures in another way, it is seen that the 13 mines which are declared to be dropping stamps are making an average return of over £1,300 per month. This is not altogether to be relied upon, any more than are the estimates relating to the T.G.M.E. as representing the results that are to be obtained over a large part of the district, but they make it obvious that we have here what is called a "small man" gold field that is worthy of a great deal more development upon the part of the Government than it has so far obtained. The reefs, which have all the characteristics of quartz ore deposits in other parts of the world, as regards patchy values and erratic variations in thickness, are nevertheless fairly continuous over hundreds of miles of country. While it would be absurd to suppose that the 15 mines referred to in the report of the Mines Department are typical of what may be discovered outside their limits, it would at the same time be even more absurd to assume that they exhaust all the potentialities of the Pilgrims Rest district. It is known, as a matter of fact, that they are very far from doing so, but difficulty of access and want of capital have hampered the progress of exploratory work on every side. There have usually been sufficient cash resources to prove the existence of profitable ore bodies, but beyond this stage financial help has generally been lacking, and the "small man" has found himself stranded in a region which should, under the fostering care of a paternal Government, be eminently suited to his requirements! In addition to the mines declaring gold, there were registered in the month of August last, ten reef diggers who were dealing with the richer gold occurrences in a more or less rough and ready way, and who obtained £1,084 worth of gold by this means during the month. There were also 13 alluvial diggers with a return for the same period of £884. In his last annual report on the district the local Inspector of Mines observes that "for the individual digger it may be said that alluvial gold digging is almost as precarious an occupation, in the long run, as diamond digging." In another part of the same report, he says, referring to Mount Anderson, that "water for sluicing is very scarce; patches of ground which are said to be rich, are lying untouched, because it is impossible to obtain water except at a prohibitive cost, and for about ten days out of every month very little work can be done, owing to the thick mist which rises and envelopes the fields." In this particular case the providing of an adequate water supply is perhaps impracticable, but there are other alluvial patches where are conditions are not unfavourable, and still the digger finds that circumstances generally are prohibitive. Large areas of profitable ground are held by companies, and it is said that these concerns are not averse from dealing on fair terms with the digger, but they cannot be expected to finance him. As a consequence of this state of things, what should be a flourishing field of industry is barred to the very class of man who alone can make it so. This is one of the problems that await the attention of the first Government that has the time to bestow upon urgent matters of this kind. The railway facilities so far provided are not all that could be desired in this connection, but they go a long way in the direction of helping the digger. The main difficulty is finance, and there are excellent rewards awaiting those who are competent to deal with the question on sound lines. One naturally looks to the Government for a lead in this sort of enterprise, by reason, in the first place, of the advantages that would accrue to the country from the fullest development of its gold resources, and secondly, because of the opportunities and means it possesses of guarding itself against failure on the part of those who need its assistance.

Mines Large and Small.

The following list is a complete statement to date of the various enterprises in the Pilgrims Rest district, where stamps are in use. The first 13 on the list are those which are dignified by the name of "mine" in the Mines Department returns; the others go by the name of diggers. A distance of about 30 miles or so separates the most distant of these ventures, and there is doubtless room for many more similar undertakings in the area over which are workings are scattered.

Name of Mine or Concern.	Farm.	Stamps Erected.
Buchanan G.M. Synd. ..	Waterval	5
Burnham Synd.	Graskop	5
Cameron Creek Synd. ..	Waterval	5
Ceylon Lydenburg, Ltd. ..	Waterval	5 and 1 Tube Mill.
C.B.R. Gold Reefs, Ltd. ..	Dientje	5
G.H.L. Tributing Synd. ..	Spitzkop	10
Glynn's Lydenburg, Ltd. ..	Grootfontein	20 and 1 Tube Mill.
Glynn's Pretoria G.M. Co., Ltd.	Grootfontein	10
Jollie-Bright, Ltd.	Waterval	5
Little Octopus G.M. ..	Graskop	5
Rex Consolidated, Ltd. ..	Waterval	10
Rietfontein (T.C.L.), Ltd. ..	Rietfontein	2 (Nissen) and 1 Tube Mill.

Name of Mine or Concern.	Farm.	Stamps Erected.
Transvaal G.M. Estates (Central Mines)	Poniesakranz; Grootfontein; Desiro	60 and 3 Tube Mills.
Do. (Elandsdrift Mine) ..	Elandsdrift	5
Do. (Vaalhoek Mine) ..	Vaalhoek	10
Transvaal's Gold Trust on Tribute	Van der Merwe's Reef	2
Wanderers Synd.	Graskop	5
R. L. Houston	Bourke's Luck	5
Formosa G.M. & Prospecting Co., Ltd.	Formosa	2
B. McCluskey	Mariepskop	3
Armoed G.M. Co., Ltd. ..	Paardeplaats	5
Fullard Bros...	London	10
D. Graham	Erasmushoop	5
Rotunda Creek Syndicate ..	Frankfort	5
J. Emanuelson	Op-de-berg	3
Sunlight G.M. Co., Ltd. ..	Drakensbergen	5
R. K. Buchanan	Waterval	2
Language Synd.	Lisbon	3
J. Kuzzulo	Graskop	2
J. Magner	Berlyn	2
G. J. Roberts	Berlyn	2

THE YEAR WITH THE MAIN REEF WEST.

Lower Profit, Yield and Working Costs—Ore Reserves Less in Quantity but of Higher Value—Payment of Debentures to be Postponed—Development of Deeper Levels.

During the year ended June 30th, 1915, 269,520 tons of ore were milled at the Main Reef West, for a profit of £50,876, as compared with 212,972 tons during 1914 for a profit of £56,641. The working costs showed a decrease of 3s. 3.247d. per ton, whilst the value of the yield decreased by 4s. 9.772d. per ton. The payable ore reserves at 30th June, 1915, amounted to 416,280 tons, with an average assay value of 5.87 dwts., over 51 inches, showing a decrease of 110,160 tons over the previous year, with a rise in value of .17 dwts. The balance brought forward from last year was £23,414 8s. 10d.; profit earned during year, £50,876 2s. 1d.; discount on debentures purchased, £1,569 17s. 9d.; interest, sundry revenue and dividends, £797 4s. 1d.; total, £76,657 12s. 9d.; from which have to be deducted: Audit fees for year ended 30th June, 1914, £315; profits tax for year ended 30th June, 1914, £3,463 14s.; current shaft sinking, £3,585 9s. 1d.; provision for redemption of debentures, £25,000; debenture interest, £14,920 3s. 1d.; debenture expenses, £217 15s.; contribution to miners' phthisis compensation fund, £4,390 8s. 4d.; income tax, £54 4s. 3d.; total, £51,946 13s. 9d.; leaving a balance to be carried forward of £24,710 19s. The following items of capital expenditure have been incurred during the year: Buildings, £99 1s. 7d.; machinery and plant, £3,707 16s. 1d.; shafts, £4,027 7s. 1d.; fencing and general surface improvements, £309 15s. 5d.; furniture. £17 10s.; investments, £39 12s. 6d.; total, £8,201 2s. 8d.; less livestock, vehicles and harness written off, £462 1s. 9d.; total, £7,739 0s. 11d. Of this total a sum of £3,585 9s. 1d. has been appropriated out of the year's profits, the remainder being provided from the funds raised by the debenture issue, the balance of cash available from this source at 30th June, 1915, being £236 7s. 6d. Since the close of the company's financial year, notice has been given to debenture holders, through the medium of the press, that a meeting of the holders of debentures has been convened for the 29th September, 1915, at the London offices of the company. This meeting has been called to consider a proposal to authorise the suspension for three years of the provisions in the debenture trust deed, requiring the company to redeem or purchase and cancel £25,000 of debentures annually, and to sanction a corresponding postponement of the final date for completing the redemption of the debentures. In approaching the trustees, relative to the postponement of the redemption of the debentures for three years, the principal object that the directors had in view was the desire to husband the company's resources so as to enable it to undertake the expense of sinking and equipping the two subsidiary incline shafts, which are necessary in order that development of the deeper levels of the mine may be effectively prosecuted. Details of the work contemplated are given in the Consulting Engineer's report. The trustees for the debenture holders have intimated that they are satisfied that it is essential in the best interests of the debenture holders, and of the company, that the proposed work should be carried out, and recommend the debenture holders to support the resolution at the meeting in question. The resolution was duly carried. Provision has, however, been made in the appropriation account for the redemption of £25,000 debentures.

Consulting Engineer's Report.

The Consulting Engineer, Mr. D. Wilkinson, writes:—The results of the operations on your mine during the past year may be compared with those of the previous year as follows: 1914—Tons milled, 212,972; yield per ton, 28s. 5.58d.; costs per ton, 23s. 1.75d.; profit per ton, 5s. 3.83d.; total profit, £56,641. 1915—Tons milled, 269,520; yield per ton, 23s. 7.80d.; costs per ton; 19s. 10.50d.; profit per ton, 3s. 9.30d.; total profit, £50,876. There was a fall in the yield per ton of 4s. 9.78d., but on the other hand, the working costs have been decreased by 3s. 3.25d. per ton, so that the net profit per ton has decreased by 1s. 6.53d., and the total profit by £5,765. The increase in the tonnage milled of 56,548 tons is due almost entirely to the better supply of native labourers. Compared with last year, the average number of native labourers employed underground shows an increase of 519, and the percentage of ore broken in the stopes by machines has fallen from 60.4 per cent. during the previous year to 40.1 per cent. during the past year. The average stoping width has decreased from 54.4 inches to 51.5 inches, due to the larger percentage of ore broken by hammer boys. Excluding shaft sinking, stations, and ore bins, the feet driven, crosscut, raised, and sunk, was 13,502, as compared with 12,454 feet during the previous year, an increase of 1,048 feet. The payable reef exposed by this development footage was 115,710 tons, having an average assay value of 5.75 dwts. over an assumed stoping width of 48 inches. The ore reserves now stand at 416,280 tons of an average assay value of 5.87 dwts. over a width of 51.0 inches, thus showing a decrease of 110,160 tons and a slight increase in value. During the past year, the Main Reef leader has been intersected on the 13th and 14th levels in the eastern section. A total of 1,355 feet has been driven on these two levels, of which, 1,295 feet has been sampled. Of this length, 535 feet has given payable values, averaging 7.0 dwts. over 48 inches. The remaining 760 feet has given unpayable values. In the western section, the Main Reef leader has been cut in the 15th crosscut at a distance of 1,110 feet from the west shaft. The results obtained from four samples are disappointing. A considerable amount of capital will have to be expended during the next two years in excavating the chambers for the hoists, rope races, ore tips, etc., for the east and west subsidiary inclines. The east shaft will be sunk to the 15th level, and at this point it will be a total length of 4,390 feet from the surface. This is the greatest depth from which hoisting can be done by the present engines at this shaft, and, hence, it is necessary to sink a subsidiary incline from this level in order to open up the deeper levels of this section. In the western section, the total depth of the 15th level from the surface is 3,200 feet, and, in order to explore this area at greater depths, a subsidiary incline from near the end of the 15th crosscut will be started at once. The sinking of these two inclines as rapidly as possible, is so vital to the immediate future of the mine, that every endeavour will be made to hasten this work during this year.

THE TRUTH ABOUT MINERS' PHTHISIS.

History of the Disease—Ravages in Other Mining Fields—The Fight Against the Evil on the Rand—What the Mines are Doing.

THE evidence of the Transvaal Chamber of Mines before the Economic Commission in 1913, contained the following statement dealing with the progress of the prevalence of miners' phthisis on the Witwatersrand and in other countries, which answers many of the questions now being asked on public platforms regarding the subject:—

It has long been known that metalliferous miners and others engaged upon working hard rock in all countries where this class of work is performed, suffer from certain forms of lung disease, but only in the last 20 years or so has its prevalence amongst the former attracted serious attention. Special effort, both by Government and others, has of late years been spent upon the investigation of the subject in several parts of the British Empire. In 1904 a very valuable report on "The Health of Cornish Miners" was issued by Dr. J. S. Haldane and Messrs. Martin and Thomas (Cd. 209). The conclusions of this report, briefly stated, were that the excessive death rate amongst Cornish miners had been due entirely to lung diseases, that it had increased recently, and that such increase was due to the increased use of rock drills, and that "the great majority of deaths amongst the latter class were attributable to the effects of rock drill work in the Transvaal and elsewhere abroad, although a considerable number were attributable to work in Cornwall." The report states that "probably at least two-thirds of the cases of lung trouble amongst the miners, including all the cases of so-called Miners' Phthisis, are to be looked upon as in reality of a tuberculous nature. . . . The predisposing cause of the excessive mortality is evidently the inhalation of stone dust," and again, "the excessive mortality from lung disease amongst Cornish miners is, practically speaking, entirely due to the breathing of air containing stone dust in suspension.

IN AUSTRALIA

In 1905 the report of the Western Australian Commission on the Ventilation and Sanitation of Mines contained reference to Miners' Phthisis—but the matter was not deeply gone into—the opinion being expressed that the disease was uncommon in Western Australia. In 1907 a report on "Miners' Phthisis at Bendigo" was issued by Dr. W. Summons, which showed that for the last ten years there had been a considerable increase of deaths from pulmonary diseases, and particularly from Tuberculosis amongst Bendigo miners. Considerable attention is paid to Miners' Phthisis, but the report concludes: "It can safely be concluded that at the present time at Bendigo miners dying of the respiratory diseases die of tuberculosis." In 1910 a Commission was appointed in Western Australia "To investigate and report on the prevalence amongst miners of pulmonary diseases—the nature of such diseases and the extent to which they are associated with or consequent on mining," the findings of which are embodied in a report by the Commissioner, Dr. J. H. L. Cumpston. This report clearly shows that the previous opinion (of 1905) as to the rarity of miners' phthisis in Western Australia is not borne out by investigation. "It is clear that fibrosis of the lungs is present in all its stages amongst miners in Western Australia, and also that the number of cases of early fibrosis is so great as to call for serious consideration." Again, "Tuberculosis of the lungs is not yet present amongst miners in Western Australia to any alarming extent." The report lays emphasis on the infectious nature of tuberculosis and the necessity to deal with any forms of infection which may appear before it spreads and becomes general. In 1911 was issued the findings of the Queensland (Australia) Commission appointed to report on "The Conditions of Work in Relation to the Health of Miners" "and the extent to which conditions contribute to Pulmonary Diseases—the means of improving conditions and the expediency of regulating the employment in mines of persons affected by tuberculosis." This report states that Pulmonary Fibrosis is not at present widespread in Queensland, but would probably become so unless preventive measures were adopted. That Pulmonary Fibrosis is not in itself a direct cause of death or even of widespread interference with the working powers of miners affected by it, but that the risk to life lies in tuberculous infection which, they think, becomes a very serious feature in the larger mining communities. Attention is drawn to the difficulty of getting the men to co-operate in any preventive measures.

In New Zealand pneumonoconiosis was scheduled as an accident under the Workmen's Compensation Act which came into force on the 1st of January, 1909, but this portion of the Act was repealed on the 24th December, 1909. The reasons for this repeal were that mine owners objected to the disease being scheduled as an accident on the grounds that it was unfair to make them liable for workmen suffering from such disease unless they could have them all previously examined to ensure that they were free from such disease before commencing work. The miners objected to any such examination. Firstly, because they held it to be degrading, and, secondly, because they claimed that, if they were deprived of their accustomed employment, they should either receive adequate compensation, or else some suitable provision should be made to secure them other employment. Insurance companies refused to take the risk unless the proper medical examination was provided for. They contended that it was a risk which could not be assessed, and if undertaken at all it must only be by such companies as cared to take it as a gamble on very high rates and not as a business risk. It became apparent, therefore, that if the owner was forced to shoulder the risk himself without any insurance cover, a big crop of litigation would spring up quite out of all proportion to the interests involved, as the difficulty of deciding as to which particular mine was responsible for the so-called "accident" would be very great. Finally, the Government Insurance Department took over the risk at an enhanced premium (£3 9s. 6d. per cent. of the wages paid, in lieu of £2 9s. 6d.) on account of the inclusion of the disease as an "accident," and then only under guarantee of indemnity by the Treasury. During the short period the Act remained in force (practically 12 months) no claims were presented, owing, apparently, to the extreme difficulty of accurate diagnosis of the disease in its early stages.

IN THE STATES.

In the United States of America no systematic official investigation into the incidence of occupational diseases appear to have been undertaken, but in 1910 a memorial was presented to the President of the United States of America by a National Conference held in Chicago, which states "the conclusions resulting from these investigations abroad are fully sustained by private investigations made on a limited scale in this country . . . . there is evidence that serious conditions in this respect (interstitial pneumonia) prevail in some of the lead and zinc mines of Missouri and in the deep mines of Utah and Nevada, but no official enquiry has ever been made. . . . We have practically no information whatever regarding the health of lead and metal miners in this country."

IN THE TRANSVAAL.

In the Transvaal.—Though it was known before 1899 that the underground workers were being attacked to some extent by a special form of lung disease, yet no general attention was directed to the matter until after the Boer War—when it became obvious from the large number of deaths amongst miners which had occurred in the interval that men who had been employed underground on the Witwatersrand Fields were peculiarly subject to an excessively high death rate due to a disease which became known as "Miners' Phthisis." In 1902 Lord Milner appointed a Commission "to enquire into the extent to which the disease prevailed, to ascertain its causes, and to make recommendations as to preventive and curative measures." The findings of this Commission were published in 1903. Viewed as a whole, the report said "the number known to be, and believed to be, suffering from the illness under investigation is sufficiently large to confirm the impression already made that the extent to which Miners' Phthisis prevails at the present time is so great that preventive measures are an urgent necessity." The Commissioners went on to state that "the disease known as miners' phthisis, or more correctly as Silicosis, has been shown to be a chronic fibrosis of the lung due to the inhalation of fine angular dust suspended in the mine atmosphere." And again, "Medical evidence has not disclosed the existence of an appreciable amount of tuberculous disease amongst miners." Subsequent investigations, although tending to confirm the views expressed *re* silicosis proper, have somewhat modified and altered the opinions with regard to tuberculosis underground, as will be seen later. Recommendations were made, aiming at the prevention of the generation and dissemination of dust in underground works, improved ventilation, and establishment of better sanitary conditions both underground and on surface. The report of this Commission had the effect of stimulating interest in the question of Miners' Phthisis—how to prevent and overcome it—and much useful work was done in studying the problem of the cause of the disease and its prevention. In 1905 regulations were issued prohibiting the use of percussion drills unless water jets or other efficient means were provided to prevent the escape of dust into the air. Further, an attempt was made to regulate the return to working places after blasting, whilst it was also laid down that all broken rock, before being removed, must be damped. No provision, however, was made to place the responsibility of using water upon the workmen, and thus the difficulty of efficiently and generally enforcing these regulations became so great that it was only when the regulations were strengthened in November, 1911, by giving proper power to the management that the efficient carrying out of water regulations became possible. In 1907 "The Mining Regulations Commission" was appointed "to enquire into and report upon the working of the Mines, Works and Machinery Regulations, and to make recommendations for any amendments thereto, necessary for the protection of the health and safety of persons working in mines. An interim report was issued by this Commission in 1908 particularly dealing with regulations for the prevention of dust. Their final report was published in 1910, and paid a great deal of attention to the question of Miners' Phthisis, and in November, 1911, certain regulations became law which were based upon the conclusions of this report, and which provided *(inter alia)* for a definite qualitative standard of ventilation in the mines of the Transvaal based upon the amount of permissible impurity in the mine air. The scope and application of measures previously laid down, such as the use of water at the underground faces, was also considerably extended. In 1908, on the initiation of the industry, negotiations took place between the Chamber of Mines and the Government with a view to the establishment of a sanatorium for miners' phthisis patients. A sanatorium was erected at a cost to the Gold Mining Companies of £52,000, and was opened in November, 1911, providing for accommodation for 70 patients, the annual maintenance cost being about £11,000, £5,000 of which is borne by the Government and the remainder by the Gold Mining Companies. The site for this sanatorium was given by the Government.

Miners' Phthisis Commission.

In June, 1911, "The Miners' Phthisis Commission" was appointed to enquire into "The extent to which miners' phthisis and pulmonary tuberculosis are prevalent amongst persons employed upon the mines within the Union . . . . and in particular to subject to medical examination persons who are or have been so empolyed." The degree to which, and the stage at which, any person employed on such mines becomes incapacitated by miners' phthisis and pulmonary tuberculosis from performing work. The number of men incapacitated, and their probable life after incapacitation, and the provision which it may appear from the medical point of view necessary to insert in any legislative measure providing for compensation or insurance against miners' phthisis. This Commission issued a report dated February, 1912, which dealt very fully with miners' phthisis in so far as it concerned the White Miners, but did not, owing to lack of time, deal with the question in connection with the native. The main conclusions of this report of February, 1912, are: 1. That Miners' Phthisis is primarily a chronic fibrosis of the lung caused initially by the irritation set up by the continued inhalation of fine stone dust over prolonged periods, which is the primary and immensely the most important cause of miners' phthisis. 2. That miners' phthisis is a *specific occupational* disease amongst metalliferous miners working in hard rock, *and is not confined to the Transvaal.* It increases the number of deaths from other respiratory diseases, pneumonia and tuberculosis. 3. That in at least the majority of cases tuberculous infection becomes superimposed towards the end upon pre-existing silicosis, but is nearly always only a terminal phenomenon. 4. That positive diagnosis of early fibrosis is practically impossible. 5. That positive diagnosis of the presence of tuberculous infection in a fibroid being is apt to be extremely difficult. 6. That the mortality statistics of the Transvaal could not give any definite guidance as to deaths from miners' phthisis, but the number of deaths pointed to a serious state of affairs. 7. Thirty-two per cent. of underground workers were estimated as having miners' phthisis in one or other of its stages, of whom two-thirds fall into the *early fibrosis* class. 8. That the incidence of miners' phthisis was dependent on the length of underground service in hard rock mines and also upon the nature of the work in which the particular miner was engaged, the order of greatest risk being: (1) Machine drillers; (2) trammers; (3) hammer-men; (4) timbermen; (5) others. 9. Eight years is given as the average time for workers underground in hard rock mines to become affected so as to be partially disabled (Class II.), whilst after a further four years of underground work it is estimated such men will enter Class III., in which their working capacity becomes definitely impaired. 10. The percentage of those affected is much higher amongst machine drillers than amongst "all miners or amongst those in any other occupational groups, and that as the period underground gets longer this demarcation becomes much accentuated." "The disease is at once more rapid, more extensive, and more regularly progressive amongst machine drillers than amongst any other group of underground workers." 11. That no class of underground worker is free from serious risk of attack. 12. They recommend the adoption of certain regulations—afterwards embodied in the Mines and Works Regulations, 1911—as to use of water and with regard to ensuring improved ventilation, and urge that stricter discipline be enforced. 13. The number of applicants for relief yearly is estimated at 1,000—1,200 with an expectation of life of from 1½ to 2 years.* 14. They conclude that miners' phthisis is a definite trade disease specific but not limited to the employment in the gold mines of the Rand, and that tuberculosis in a miner cannot be so regarded. 15. They recommend moderate compensation to men in the early stages of fibrosis and prohibition of all further underground work. 16. They recommend compulsory medical examination of mining recruits, who should be—(a) of good physique; (b) free of tuberculosis and fibrosis of the lung. 17. That no man having received compensation should be permitted to resume work underground. 17. That pulmonary tuberculosis should be scheduled as a "*compulsory notifiable disease*," both for white and black.

What the Mines are Doing.

The mines have spent large sums on ventilation of workings, upon the laying of water in pipes to working faces, and upon various methods of allaying dust with sprays, molasses, etc. As a typical instance of direct cost on one mine where there are 260 stamps, the installation of the ventilation system cost £5,000 and running costs thereof amount to £950 per annum, whilst some £3,100 has been spent on installation and running of the water and dust allaying systems to date. Some £250 per month is now being spent on the upkeep and extension of the same, exclusive of cost of water. The total cost per ton milled for this being about 1½d. Early in 1912 a permanent committee was established by Government called the Miners' Phthisis Prevention Committee, consisting of officials of the Government Mines Department, Consulting Engineers of various groups, Mine Managers, Miners, Doctors, and with the Government Mining Engineer as chairman, for the purpose of making experimental investigations into the best means for the prevention of miners' phthisis. This committee has reported from time to time, and various amendments to the mining regulations have been made in consequence, and suggested improvements of methods adopted. The funds necessary for the carrying out of its experiments, etc., are provided by the Government and the Mining Industry in equal shares. After the passing of the Mines and Works Act, 1911, the machinery for enforcing the observance of the regulations dealing with the prevention of dust was made much more effective, more power was put in the hands of the Managers of the mines in dealing with breaches of the regulations, and more incentive given to him and his staff duly to enforce the observance thereof. The difficulty of getting every individual to understand the grave importance of doing his individual best to stop the creation and circulation of dust underground was very great, for without the power of forcing men to co-operate, the management was practically helpless. As shown above, big sums have been spent by the owners in the effort to meet the dust problem. The Government has tightened its regulations and its organisation; extra inspectors have been appointed; closer attention given to all breaches of regulations, either by management or men; the hours of work have been lessened, first of all to eight hours at the face. The mine air is sampled and analysed at regular intervals. A serious attempt is now being made to control blasting hours, a step which, if efficiently and generally taken, will probably have a far greater effect upon the lessening of miners' phthisis in these mines than anything which yet remains to be done. Here it must at the same time be noted that the closer study and control of tuberculosis as effecting the gravity of miners' phthisis calls for most serious attention. From what knowledge we have gained, there can be no doubt that a considerable number of men who work underground have tuberculosis, especially natives, and that owing to their tubercular condition they are more prone to miners' phthisis, or silicosis, whilst silicosis itself is rendered much more deadly by the presence in the underground workings of infection from tuberculosis, and all the investigations in other countries accentuate the importance of the control and eradication of tuberculosis in miners. It is thus seen that though neither the Mining Industry as a whole, nor the Government, have, until within recent years, seriously attacked the problem of miners' phthisis in our mines; yet great strides have now been made, especially within the last two years. At present this cannot be demonstrated by actual figures. But it may be said it is the general opinion of all well-informed observers who have kept in actual touch with the position that we have reached such a stage now in our fight with miners' phthisis that we have little or nothing to fear from the disease if the effort be maintained. In support of this contention we need only quote the Government Mining Engineer's evidence given before a Select Committee of the House of Assembly in April, 1913, when enquiring into the extension of the field of employment for Europeans throughout South Africa. Asked whether he thought it a healthy principle to encourage people to work in the mines, he said: "Yes; two years ago I should have had my doubts, because of the miners' phthisis business, which was brought home so forcibly to us. I should have said that the life of a miner, which is from five to ten years, was not one that should be attractive to anybody. But to-day the conditions are so much improved, and the changes are so great, that I think *it would be difficult for a man to get phthisis.* We can certainly retract what we then thought and look upon mining, not as a disaster to the individual taking it up, but as a means of prosperity to him and the nation." In regard to this statement it may be pointed out that even if no miners' phthisis cases are being produced at the present time, it must be several years before there are no persons afflicted with this disease working on the mines, owing to the time that must elapse before all persons who in the past have contracted miners' phthisis have been eliminated.

Summary.

Miners' phthisis has had such a bearing upon the direct economic side of the industry, as well as upon the humanitarian aspect, that it is if the utmost importance to most clearly emphasise:—

Firstly, that undoubtedly the seriousness of the disease was not at first understood. But that now there can be no doubt a very real and very big effort has been made within the last two years to eradicate the disease, and that no expense is being spared, and that an enormous amount of thought and energy have been put into the work.

Secondly, that the great efforts which have been made to eradicate the disease have met with success, and that as a danger of appreciable dimensions the disease will, in the course of the next few years, practically disappear from our midst.

Thirdly, that the question of the existence and spread of tuberculosis, especially amongst the coloured workers, is of the gravest importance to-day, and should be at once more vigorously investigated, as its presence greatly complicates the position with regard to fibrosis.

Fourthly, that whilst every means should be maintained to secure the continued co-operation of effort and thought of all owners and of every member of the mine staffs in eradicating the disease, it is also of the utmost importance that the co-operation of every worker underground should be secured and maintained towards this end.

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*In any comparison that may be made between this estimate and the actual claims on the Miners' Phthisis Board to date, it must always be remembered that the estimate refers only to the current yearly applications under Classes (3) and (4) (total incapacitation). It does not refer to cases of partial incapacitation, nor to the abnormal (cumulative) claims that may be expected in the first year or two of the operation of a compensation fund.

Fifthly, that when comparing the Witwatersrand with other hard rock mining centres the greatest care should be taken to examine the statistics compiled from other centres. It is more than doubtful in most instances whether the comparative figures are compiled with any attempt at accuracy or completeness, or on the same basis. In other countries little or no attention is paid to the collection of reliable or full data on such a subject. In some cases, perhaps, it is felt that too careful or full a statement might only form a bad advertisement for the district and keep possible immigrants away. In other cases, owing to the fact that mines occur mostly as comparatively isolated and scattered factors, the number of persons affected in any individual mine by any such trouble as miners' phthisis, though possibly of importance relatively to the workers in such mine, become swallowed up when considering the whole district, and is no longer a sufficiently important factor in the district to warrant or draw any particular attention.

ECONOMICS AND THE WAR.

Another Scientific Forecast of the Reactions of the Great War Upon Industry, Credit and Finance.

The circumstance of war gave to the Economic Science Section of the recent British Association meeting as great an opportunity as any section has had this year. The vast upheaval that the terrible events of the past fourteen months have occasioned; the wastage of life and treasure; the industrial bearing of the war both in regard to the production of munitions to assist the forces and in regard to the conduct of industry after the war; these have brought before all our minds problems of the utmost importance. The settlement of many of the difficulties that have presented themselves has of necessity been the action of a people living "a day at a time." Everything of the kind is, more or less, temporary, and designed for the purposes of the moment. Many of the questions will have to be considered and re-considered probably time and time again in the years that are coming. "Not the least dominant phase of this epoch-making struggle is the economic one," said Prof. W. R. Scott, the President of the Section, in the opening sentences of an address devoted to consideration of "some of the reactions of this great war upon industry, credit and finance." It is recognised by him in the course of his remarks that "the two most critical periods occasioned by war are, first, the change from peace organisation to war organisation, and secondly, the converse change after the conclusion of hostilities on a large scale." Space prevents us at the moment from quoting fully Prof. Scott's references to the manner in which specialised labour and capital were transferred from one process to another, but we quote his reference in regard to what is to follow:—All this is satisfactory for the war period; it must be remembered that on the return of peace the reverse change will have to be made. There may be a short trade boom (arising out of the attempt to restore some of the material ravages of war), but the joint demand from it and from the trades re-opened is likely to be considerably less than the huge present expenditure on manufactures for war. Thus the unemployment occasioned by dislocation of industry through hostilities is likely to be carried forward as a species of suspense account which must be liquidated not very long after peace. Moreover, international credit is likely to re-act on the situation in a prejudicial manner. Even already the financial system of Germany is more strained than appears on the surface. The fact is advantageous to us as belligerents, but it will probably be prejudicial to us not long after the re-establishment of peace. At present much of the inconvertible paper circulating on the Continent does not affect us here. When the inflation has to be squeezed out after the war, a disturbance of credit is not unlikely. Prof. Scott concluded his very interesting address as follows:—

A special aspcet of the problems under discussion is the provision of capital for the re-starting of trades contracted by the war and for the restoration of Belgium and other regions desolated during the progress of hostilities. Chalmers, writing a hundred years ago, supposed that in cases of this kind "in a very few years the recovery both of population and labour would be completed." The explanation he gave was far from satisfactory even for the time at which it was written, and it is still more deficient as applied to the present circumstances, when in industrial countries fixed capital is much more important than in Chalmers's day. In the last quarter of a century any great catastrophe, such, for instance, as the partial destruction of San Francisco by earthquake and fire, has been repaired with comparative ease by bringing capital from outside. But the waste of war renders capital exceedingly scarce; in fact, a famine of capital after the war has been predicted. Such an anticipation is over-pessimistic, but capital is likely to be obtainable for a time only with some difficulty. It is to be feared that after the war Europe will experience very considerable straits for several years to come. Not only must the waste of war be made good, but its evil legacy in inflated funded and floating debts must be gradually dealt with, lessening by reason of increased taxation the normal margin for new savings. Increased work and greater economy are the only remedies, aided by improved methods of production.

"It is to be hoped that some of the inevitable loss will be repaired in time by better methods of organisation and by an accelerated rate of invention. The waging of a just war results in a quickening of the national spirit. It forces a nation out of the easy and well-worn paths of custom and convention. Thus, out of all the suffering and all the loss, some good will come. The large proportion of our young manhood, which has gone to serve the country on the seas or on the field, and which returns having looked death in the face without being afraid, will not take up life where it was left. The noble qualities that have been evoked by the stress of battle will remain and will influence civil life during the next generation. The outlook will be both broader and also more simple. Methods of social legislation and administration will become more direct and less timorous. The men who have dared greatly and who have endured will chafe against the rules that have been formed during easier times. Great wars tear away the veils which hide the essential needs of living and reveal what is fundamental. The directness of vision that has faced danger is not likely to be alarmed in facing the difficulties of our social and industrial problems. And so we may expect with confidence that our legislation will be bolder and also more sane than it has been in the past. The sacrifices of so many cannot pass, when the war is over, and leave no trace. The nation has been re-vitalised in the course of the struggle and the influence of this movement will persist. In many respects the economic problems that will confront us after the war will be even more serious, and certainly not less difficult, than those of the present time. Still, there can be no doubt that these will be faced with courage and patience. The period of stress through which we are passing has shown the unity of thought and purpose throughout the whole Empire. And this, in spite of many appearances to the contrary, will be a great asset in the future. The great national emergency has caused a closing of the nation's ranks, and it rests with us to keep them firm and steadfast when peace returns. There are plain signs that it may not always be easy, since so many industrial and other difficulties have been carried forward as a suspense account which is to be dealt with when the war is over. National unity is enabling us to progress towards victory, and the same unity will be required to enable us to reap the full fruits of that victory at home. It will be a mad waste not to employ the qualities of heart and mind which have been aroused in this great struggle in the service of peace and social progress. The future may be difficult for some years to come, but difficulties are the opportunities of the strong and courageous. It has fallen to us to live in an heroic age; and, if we remain true to ourselves and to our high destiny, we shall have the strength and fixity of purpose to achieve greatly in peace as well as in war."

Zaaiplaats Tins: September Results.

The results from the Zaaiplaats Tin Mine for the month of September, 1915, are as follows:—Days ran, 30; ore milled, 2,567 short tons; residues retreated, 1,769 short tons; concentrates won, 70 long tons; average value of concentrates, 68 per cent. M.T.; estimated profit for the month, excluding Government taxes on profits, £1,601 18s. 6d.; deduct adjustments in respect of estimated values of previous shipments, £312 13s. 11d.; profit declared for the month, £1,289 4s. 7d.; capital expenditure, £15. Note.—The revenue for the month has been calculated on the basis of tin at £150 per ton.

WRIGHT'S ROPES.

A REVIEW OF THE DIAMOND TRADE.

Position of the Netherlands Diamond Cutting Industry—U.S.A. Imports.

The following is an extract from the *Journal of the Royal Society of Arts*, dated 10th September, 1915:—The diamond trade, one of the most important of all Dutch industries, experienced in 1914 one of the most trying years in its history. Exports to the United States, its principal market, heavily declined, and general conditions were unfavourable. The increased duty put upon both rough and polished diamonds by the American Tariff Act of 1913 and the financial situation contributed to the decrease. There was another disturbing factor in the early part of the year, that is, dissatisfaction with the business methods of the Antwerp Syndicate, which handled the supply of German rough diamonds. *In April, however, the London Syndicate assumed control, the change bringing about an immediate feeling of relief.* Shortly thereafter, when the conference of representatives of the principal mining concerns at London decided to limit production, a revival of trade was confidently looked for. When the war broke out, however, diamonds almost ceased to be articles of commerce, the cutting and polishing factories practically closing down. Trade was stagnant, and so remained until near the end of the year, when operations were resumed in a few establishments on a diminished scale. Work undertaken before the war had to be completed, but only a few concerns did business of any importance. True, there were transactions among the diamond brokers and dealers, but none of consequence, and the strenuous efforts of leading men in the trade to maintain a scale of prices came to naught. It is hardly possible that there can be a revival in trade during the continuance of the present war; but in the best-informed circles the feeling prevails that the return of peace will mean new life to the trade. It is within the memory of many that after the Franco-German war it experienced a long period of prosperity. The South African war of 1899 brought hard times, but with the declaration of peace there was a surprisingly quick revival, which was only broken by the general financial crisis of 1907. According to a report by the United States Consul at Amsterdam, the diamond industry gives employment to more than 10,000 working people—sawyers, cleavers, polishers, cutters, etc. Of this number about 9,800 are members of the Amalgamated Union of Dutch Diamond Workers, a beneficial organisation, the records of which show that at the beginning of 1914 over 5,000 of its members were out of employment, and that during the seven months preceding the war the average of unemployed was nearly 4,000. When the war began about 80 per cent. of the employees were out of work, and the remainder were on short time. The following table shows the value of shipments of diamonds to the United States from January 1st to July 31st, and from August 1st to December 31st, in 1913 and 1914:—

1913.

Kinds.	Jan.-July.	Aug.-Dec.
Rough	145,611	51,420
Polished	1,580,085	457,055

1914.

Kinds.	Jan.-July.	Aug.-Dec.
Rough	55,766	33,741
Polished	899,453	132,124

In analysing the foregoing figures it might appear that the European war had but little influence on the movement of diamonds from Amsterdam to the United States, the decrease after August 1st not being so pronounced as would naturally be expected. In this connection it should be remembered that among the thousands of Belgian fugitives arriving at Amsterdam at the time Belgium was invaded were many diamond dealers, who, after bringing their stocks to Amsterdam, shipped them to the United States to be sold for the best obtainable prices.

ROCK DRILLS IN USE ON THE RAND.

[By E. M. Weston, A.S.M.B.]*

It is not my intention to give a detailed description of any rock drill, such can be found in my larger book on Rock Drills; but the miner should know something of the types of machines in use here. Machines for drilling rock are divided into two main classes—piston drills and hammer drills. In the piston drill the piston is fastened to the drilling tool, and the tool moves backwards and forwards with the piston. In the hammer drill the piston is separate from the drilling tool, and strikes it directly or indirectly to cause it to cut the rock.

Large Piston Drills.

The chief large 3¼in. piston drills in use on the Rand are the Holman, Ingersoll, Climax and Konomax. The first two are called auxiliary valve machines, because there is a small valve or valves which govern the movement of the main air valve that regulates the flow of air to one end of the piston or the other. In the Holman drill these auxiliary valves consist of two balls at each end. The two top ones form the valve and the bottom ones project into the cylinder, and the piston lifts them up when it passes too and fro. It has two shoulders on it for this purpose. These thus lift the top ball valves and they allow air to pass to move the main air valve. The miner when he finds his machine not working well should first take off the air chest and examine the air valve to see that it or the passages leading to it are not choked with grit. If this is in order, take out the balls on each end (this is done most easily by putting in the heated end of a candle to lift them out). It will generally be found that any trouble is due to wear on the lower set of balls, which are thus not lifting properly and require removal, and a new set must be put in their place.

The Ingersoll.

In the Ingersoll machine the auxiliary valve is a half-hoop of steel, of which one end or the other projects into the cylinder and is struck and lifted by shoulders on the piston as it moves back and forward. This valve is subject to wear, but there is an arrangement for allowing it to enter the cylinder further as it wears, but when too much worn it must be replaced. The main air valve in both these machines may have become too tight or too slack. When it is just right and when the air chest is turned upside down it should slide just quietly down, not stick (if too tight), or fall quickly (if too lose and too much worn).

The Climax.

The Climax and Konomax rock drills are simple air valve machines, that is, the valve is thrown over by the movement of the piston in the cylinder opening air ports, which directly control the movement of the air valve. The Climax machine has, however two rubber plugs, which can be forced down into the cylinder to make up for any wear in the piston or leaks in the piston rings which would interfere with the proper movement of the valve. The Konomax machine is designed to use very little air, only about half that of the other drills. It requires to be kept in first-class condition, and should go to the surface at least every two months for an overhaul These machines do better work with a high air pressure

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*From "Practical Mining on the Rand."

STOPERS.

The small machines of 2¾in. and 2½in. diameter of cylinder used mainly for stoping in use are the 2¾in. Holman, like the large Holman; the 2⅝in. Konomax, like the large Konomax; the 2¾in. Butterfly Ingersoll drill, which has a valve which swings too and fro like a double door swinging on a post; the Siskol drill, which has an air valve something like the Climax large machine; the Eagle drill, which is a very light tappet valve drill in use at Randfontein. There are some others also with ball and air valves. Grit getting into these machines is more likely to give trouble than in the large machines, as the air passages are smaller. The valves otherwise should give no trouble unless affected by wear. The tappets and valve on the Eagle drill are subjected to very severe wear and require frequent attention.

HAMMER DRILLS.

Hammer drills can be divided into several classes. There are those which work without a valve, in which the movement of the piston acts as its own valve; these are called valveless. One type of Waugh drill and of Ingersoll drill belong to this class. Most of the others are provided with a valve, such as in the Waugh valve machine, Ingersoll Butterfly and Leyner machines, Atlas 'drill, Hydromax, Holman, and Flottman.

SOLID VS. HOLLOW STEEL.

We might again class these drills as those feeding water or air and water through hollow steel to the cutting bit, and those using solid steel only. Nearly all makers supply models for both kinds of work now. The Leyner principle is to supply air and water mixed down the hollow steel through the machine to clear out cuttings from the hole. Others, like the Hydromax, use the same system, and others try to introduce water into the steel itself. Generally speaking, the trouble with such water-supply systems is due to rapid wear and vibration causing leakage. Quite a lot of skill and care is needed in looking after such machines. We might divide hammer drills, again, into those fed forward in a cradle with a screw like a piston drill, such as the Leyner, and those with an air feed which pushes them against the rock. These may be mounted or not on bars and arms. Again, some hammer drills have (like the Leyner and Flottman) autmatic rotation, and others need to have the jumper turned or oscillated by hand. At present progress in hammer drills is hampered by the difficulty of always getting hollow steel to stand in the hard rock and in the extra care and skill needed in their use.

Geological Society of South Africa.

The next monthly meeting of members of the Geological Society will be held in the Council Chamber, Chamber of Mines, Johannesburg, on Monday Evening, October 18th, 1915, at 8.15 p.m. Business: The minutes of the ordinary monthly meeting held on the 26th July, 1915, will be read. The following papers will be open for discussion: "The Upper Witwatersrand System, including the Main Reef and Associated Beds," by E. T. Mellor, D.Sc. (Lond.); "The East Rand," by E. T. Mellor, D.Sc. (Lond.); "The Geology of Part of Namaqualand," by A. W. Rogers, Sc.D. (communicated by permission of the Hon. the Minister of Mines and Industries); "The Dwyka Series in South West Africa," by P. A. Wagner, D.Eng., D.Sc. The following papers will be read: "On the Zinc and Lead-ore Deposits near Zeerust, Western Transvaal, South Africa," by the late Wm. Anderson, F.R.S.E., etc. (communicated by Geo. S. Corstorphine); "Description of a Carbonaceous Mineral occurring in the Witkop Mine, near Zeerust, Transvaal," by C. Anderson, M.A., D.Sc. (Edin.), Mineralogist to the Australian Museum, Sydney (communicated by Geo. S. Corstorphine).

How P. P. P. Works

Positions of REGULAR P. P. P. Packing in Stuffing-Box of Low-pressure, Non-condensing Engine.

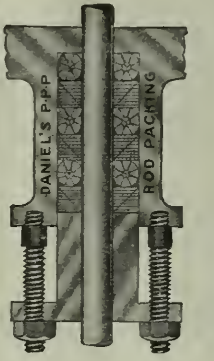

Fig. 1.
Fig. 1 shows the Packing when first put in.

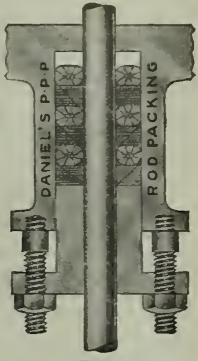

Fig. 2.
Fig. 2 shows the Packing under pressure, after it has adjusted itself to the rod and box. The compression of the cushions and the slide of the wedges are clearly seen.

P. P. P. reduces friction 75 to 95 per cent, because the sliding wedges press against the rod only on the backward stroke and release the pressure on the forward stroke—at no time is the bearing on the rod in excess of that necessary to keep it steam-tight.

P. P. P. is self-lubricating. The cushion absorbs oil put on the rod or fed to the box and distributes the lubricant evenly and regularly.

P. P. P. is elastic, due to the sliding of the wedges and the yielding of the compressible cushion.

P. P. P. lasts because it creates the least friction, and the varying pressure prevents continuous wear.

DANIEL'S
P. P. P.
Rod Packing.

Makers of Daniel's EBONITE Sheet Packing, Daniel's EBONITE Steam Hose, Rubber Belting and full line of Mechanical Rubber Goods. QUAKER TYRES for Automobiles are "Miles Cheaper."

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NATIONAL TRADING CO.,
P.O. Box 2762. JOHANNESBURG. Phone Nos. 1205, 1250.
SOLE AGENTS FOR SOUTH AFRICA.

A YEAR OF MINE NATIVE RECRUITING.

Points from the Annual Report of the Native Recruiting Corporation, Ltd.

The report of the board of management of the "N.R.C., Ltd.," presented to members at the third ordinary general meeting, held on October 11—reported in another part of this issue—shows that the number of natives recruited by the Corporation, including voluntary, local and contractors' natives, together with the natives received from the Witwatersrand Native Labour Association, during the twelve months ended 30th June, 1915, was 192,003, from the sources shown in the following table, and the number of natives transferred from one member to another was 897, giving a total of 192,900:—

	Recruited.	Vol'tary.	Local.	Total
1.—BRITISH.				
Cape Province	53,146	15,552	9.310	78.308
Natal and Zululand	6.385	3.115	3.076	12.576
Swaziland	4.336	464	414	5,214
Transvaal	9,150	5,639	3.613	18,402
Bechuanaland and Bechuanaland Protectorate	6,335	603	807	7.745
Basutoland and O.F.S.	19,520	1,188	2,432	23,140
Others	116	178	1.128	1,422
2.—PORTUGUESE.				
East Coast natives South of Latitude 22° S. (recruited by the W.N.L.A.)	29,885	6,500	8,811	45,196
	129.173	33.239	29.591	192.003
Natives transfered from one Member to another				897
Grand Total				192,900

Note.—Voluntary natives are those who come direct from their homes to the mines. Local natives are those who transfer from one mine to another, or from other employ to that of mines.

DISTRIBUTION OF NATIVES.

The labour position of members at the 30th June, 1915, was as follows:—

	Number of Employed Underground.	Percentage of Underground Complement.
1. East Coast, South of Latitude 22° S. ...	46,849	30.06
2. British South African Natives	74,279	47.66
3. Others	1,292	.83
Total	122,420	78.55
Total employed on Surface	30,564 equal to 75.15% of Surface Complement.	
	152,564 equal to 77.85% of Total Complement.	

The corresponding figures at the 30th June, 1914, are given below:—

	Number of Employed Underground.	Percentage of Underground Complement.
1. East Coast, South of Latitude 22° S. ...	38,449	25.56
2. British South African Natives	65,497	43.55
3. Others	2,172	1.44
Total	106,118	70.55
Total employed on Surface	30,564 equal to 75.14% of Surface Complement.	
	135,448 equal to 71.49% of Total Complement.	

COMPLEMENTS.

The Consulting Engineers' Committee of the Corporation have, during the period under review, dealt with the quarterly adjustments and special allowances of members' native labour complements. The total complements of all members at the 30th June, 1915, and the relative figures at the 30th of June, 1914, are as follows:—

	June 30, 1915.	June 30, 1914.
Underground	155,843	150,406
Surface	40,667	39,045
	196.510	189,151

WASTAGE.

The net wastage (*i.e.*, natives taking their discharge, deserted and died) during the twelve months under review was 171,148.

CONTRACTORS' NATIVES.

The number of natives recruited by contractors for the twelve months ended 30th June, 1915, shows a slight decrease as compared with the previous twelve months. The only contractors at present authorised to recruit for your members are Messrs. Marwick and Morris, who operate on behalf of the East Rand Proprietary Mines, Ltd.

EAST COAST NATIVES.

The number of East Coast natives, including "specials," received from the Witwatersrand Native Labour Association during the twelve months ended 30th June, 1915, for distribution to members of the Corporation was 29,885, showing an increase of 7,892 over the number received during the year ended June 30th, 1914.

ACCOUNTS.

Liabilities: The registered capital of the Corporation consists of 2,500 shares of £1 each, of which 1,948 fully paid shares have been issued to members. Payments made by members on the basis of their total native labour complements amounted to £71,628 15s. at 30th June, 1915, being 7s. 6d. per unit of complement, leaving 12s. 6d. per unit of complement uncalled at that date. The item £33,789 1s. 1d. includes the sum of £21,250 19s. 3d. due to members on account of rebate payable in reduction of the cost of labour supplied.

Assets: Debtors, £63,207 17s. 2d. This consists chiefly of advances made to agents for recruiting purposes, and amounts owing by members for labour supplied and outstanding at 30th June, 1915.

Reserve Account: At the 30th June, 1914, an amount of £50,000 was standing to the credit of this account as a provision against possible losses on account of advances made to agents. At the close of the financial year all amounts owing by agents which were considered bad were written off against this reserve account and the balance transferred to receipts and expenditure account.

Rebates to members: During the year under review a rebate of £68,785 18s. 11d. was received from the Witwatersrand Native Labour Association, Ltd., which was distributed to members of the Corporation in reduction of the cost of labour on the basis of fees paid by them. A further distribution of £50,347 3s. 3d. to members was decided upon as at the 30th June, 1915, which absorbed the surplus of receipts and expenditure, making a total refund to members of £119,133 2s. 2d.

ANSWERS TO CORRESPONDENTS.

"Cloverklip" (Brakpan).—(1) Certainly, if the outlook improves. (2) Yes. (3) Yes. (4) About 8s. (5) It is impossible to say.

"Senex."—You should certainly not sacrifice them now.

"Alpha."—The Enterprise Syndicate is a Kimberley concern, and is now in liquidation.

MINING INSTITUTE.
TEACHING CENTRES:—{ JOHANNESBURG AND SCHOOL OF MINES, KIMBERLEY.
Prof. YATES prepares candidates for the following Government Certificates:—
MINE MANAGER'S. MECHANICAL ENGINEER'S.
MINE OVERSEER'S. ELECTRICAL ENGINEER'S.
MINE SURVEYOR'S
by Class, Private Tuition and Correspondence
SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - - 66% "
MECH. ENGINEERS- June (Kimberley Centre) - - ALL "
MINE OVERSEERS - - - - - Practically ALL
NEARLY 200 SUCCESSES. St. James' Mansions, Eloff Street.

THE WATER SUPPLY OF THE RAND.—X.

[By W. Ingham, Chief Engineer, Rand Water Board.]*

Steel and Cast-iron Pipes.

The failure of steel pipes under certain conditions is a matter which I consider of sufficient importance to refer to briefly this evening. In many places in Africa it has been necessary to take up short lengths of steel mains which have only been laid a few years. The tensile strength per unit of area of mild steel as compared to cast-iron may be taken at about 3·5 to 1, so whereas a steel pipe 3-16ths of an inch is strong enough to withstand a certain pressure, it would be necessary to make a cast-iron pipe ⅔ of an inch thick if the same factor of safety is required. It therefore follows that steel pipes are very thin compared to cast-iron pipes and are much more easily penetrated by corrosion than cast-iron pipes when the pipes are laid in certain kinds of soil, so it is necessary to cover steel pipes with some protective material to obtain the same life. Coating the pipes externally with bituminous composition is insufficient in pyritic soils, and it is now usual to cover the pipes with jute dipped in bituminous composition after giving the pipe a preliminary protective coating. Whilst visiting the British Welding Company's works near Glasgow last year, I inspected a new method of protecting the pipes, and a brief description is submitted:—The pipe is first heated in an oven to a slightly higher temperature than the bath, and it is then dipped into the solution and allowed to stay there for a few minutes. It is then taken out of the bath and placed in a lathe, where it is slowly revolved. Hessian cloth (jute) dipped in the coating solution is then wrapped around the pipe while it is revolving. At the same time as the cloth is being wrapped around the pipe, firebrick or earthenware pipe crushed to pass through a 1-16th inch screen is allowed to fall on the Hessian cloth and is pressed into it. Pipes ordered by the Metropolitan Water Board which were 36 inches in diameter and ½ inch thick and 24 inches diameter and ¾ inch thick, respectively, were being coated in this manner during my visit. The thickness of the three coatings when finished is about 3-16ths of an inch, and this should prove a very effective protection in cases where the pipes are subject to acid subsoils. The soils which usually cause most corrosion are those containing pyrites and certain salts with an acid base. The organic acids derived from peat beds also attack pipes internally and externally, and it is necessary to protect the pipes in such cases. The internal protection is usually provided by a bitumatic composition, but this only lasts for a comparatively short time, so it is necessary to treat the water in cases of this kind so as to make it alkaline. If steel pipes are properly protected, there is no reason why the life should not be as long as that of cast-iron. In deciding whether it is desirable to lay a steel or cast-iron pipe, the cost should be carefully considered. For instance, the cost of 15-inch steel pipes on the Rand in ordinary times may be taken at about £22 per ton and cast-iron at about £18 10s. per ton. As, however, the weight of cast-iron to mild steel for the same strength is roughly 3½ to 1 the prime cost of the pipe per foot is in the same ratio. Steel pipes are also much longer than cast-iron and in the case of the Zuurbekom main of the Rand Water Board laid about three years ago, the 18-inch steel pipes were 39 ft. in length, whereas cast-iron pipes would have only been 12 ft. long. This makes a considerable difference in the laying costs and in the case of cast-iron provides a larger number of joints for leakage to take place. In deciding the question of laying steel or cast-iron pipes, the life and cost per yard laid should be taken into consideration to see if a steel pipe will ultimately be cheaper. The difference in the initial cost of the two classes of pipes should be obtained and capitalised at compound interest over a period of years which represents the difference, if any, in the life of the pipes.

Portland Cement.

The Engineering Standards Committee (England) have revised the specification for Portland cement. The most noteworthy alterations are as follows:—(1) Reduction of the permissible residue on the standard sieve with 32,400 openings to the square inch. This has been reduced from 18 per cent. to 14 per cent. (2) Tensile tests: In the old specification the minimum breaking load was 400 lbs. per square inch at seven days and 500 lbs. per square inch at 28 days. Now the minimum for the seven days is 450 lbs. and the 28 days breaking load must not be less than the combined figure obtained by adding to the seven days breaking load an amount arrived at by dividing 40,000 by the seven day load. Therefore it follows that the 28 day test must always be above 539 lbs. per square inch. The 3 to 1 sand briquette test has also been raised from 150 lbs. per square inch to 200 lbs. per square inch, and the 28 day test must exceed the sum of the seven day test by a figure which is arrived at by dividing 10,000 by the seven days breaking load, so the tensile strength in this case must always be above 250 lbs., the breaking load at 28 days.

Solar Energy.

Professor J. J. Thomson, in a lecture on "Radiant Energy and Matter," given before the Royal Institution, stated that the energy sent to the earth from the sun is much larger than many people realise. He says that when the sun is shining in a clear sky, it transmits to the earth sufficient energy to develop 7,000 horse power per acre, and further that by lowering the temperature of the earth about one degree sufficient heat could be obtained to generate enough power to run the whole of the world's industries. During my visit to Egypt last year, I examined the sun power plant which had been erected at Meida near Cairo for raising water from the Nile for irrigation purposes. Briefly, the heat of the sun is utilised to raise steam by reflectors set in such a manner as to focus the sun's rays to a steam boiler. The steam is generated at about atmospheric pressure and is utilised by a specially designed low pressure condensing engine and the steam pressure can be reduced to about 4 lbs. absolute before the plant becomes inoperative. The plant commences to work at about 6.30 a.m. and reaches its maximum power between 11 a.m. and 2 p.m. The parabolic reflectors, which are 204 ft. long and 13 ft. 4 in. wide, are so arranged as to always point towards the sun, thus obtaining the maximum amount of sunlight. The mirrors are set in a light steel framework, and are constructed of third-class window glass, 1-16th of an inch thick, silvered on the back. The boiler which is 15 inches high, is tubular at the top and flat at the bottom, and is placed at the focal point of the parabolic reflectors (see lantern slide). The absorbers are constructed to withstand a wind pressure of 30 lbs. per sq. ft. The steam cylinder is 36 inches in diameter and 36 inches stroke, and is coupled to a ram pump, which has an adjustment for shortening the stroke. The reflectors for the above plant cover about 0·75 of an acre, and this area will generate about 50 horse power. The cost of a plant similar to the above at a place within easy reach of the coast may be taken at about £1,600 to £32 per b.h.p. The thermal efficiency of the plant has been given at 57 per cent., but this is probably on the high side. The area on the earth's surface where sun power plants can be erected is somewhat limited, and to be successful it is necessary to have powerful sunlight and a dry atmosphere for at least eight hours per day, and this can only be obtained in the tropics. The total amount of power generated by various classes of fuel throughout the whole world may be taken at about 270 million horse power operating for 24 hours per day during the whole year, and this power can be produced by sun power plants on a square whose sides are 143 miles in length.

(To be continued.)

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* From Presidential Address read before the S.A.I. of E.

METALLURGICAL PRACTICE ON THE RAND.—VIII.*

[By F. L. BOSQUI, lately Chief Consulting Metallurgist to the Rand Mines-Central Mining Corporation.]

PRECIPITATION.

The use of filiform zinc for precipitating gold was introduced on the Rand by MacArthur, in 1890. At first no difficulty was experienced in the deposition of gold from the stronger cyanide solutions required for sand treatment; but when it was found possible to recover gold from slime with much weaker solutions precipitation on zinc became more difficult. It was at this time that the Siemens-Halske electrolytic process, which was more effective than zinc in dealing with these weak solutions, threatened to replace the older method; but owing to serious defects in operation, already touched upon, it was finally abandoned in favour of the zinc method, which had been rendered much more efficient by the immersion of the shavings in a solution of acetate of lead, preparatory to filling the extractor boxes. With this exception, precipitation practice on the Rand does not differ materially from that in other mining districts where filiform zinc is used. The zinc shavings are cut in the usual manner to a thickness of about 1-500 in. and 1 cubio foot of such filaments loosely packed, pe ton of solution per twenty-four hours, is the average allowance for capacity of extractor boxes. These boxes, usually built of steel, are from 4 to 6 ft. wide, and of corresponding depth, with six to ten compartments. The existing system of gold precipitation, though highly efficient on the dilute solutions used on the Rand, admittedly possesses many awkward features which have for years stimulated investigation with a view to devising a more compact, positive, and less wasteful substitute. Its weak points are (1) the great area required for plant; (2) the labour required in dressing and cleaning up extractor boxes; (3) the uncertainty of clean-up, owing to the variable distribution of gold not immediately recoverable; (4) the impossibility of recovering at once all gold deposited within a given period; (5) the enormous loss of zinc in the destructive process of recovering its gold content. The Merrill zinc-dust method, as perfected in America, offered certain distinct advantages over the older process. It is neater and more exact in operation, requires less labour, and possesses the very attractive feature of yielding a complete clean-up of all the gold deposited. After practical trials this process was introduced at three Rand mines—the Brakpan, New Modderfontein, and Modderfontein B. At New Modderfontein the conditions of precipitation are somewhat peculiar, and imposed a very severe test on the Merrill process. At this plant a solution of under 0.01 per cent. in KCN is effective in dissolving gold in the slime. The resultant gold-bearing weak or slime solution is comparatively simple in composition with a very low metallic and cyanide content, which rendered it extremely difficult to precipitate satisfactorily on zinc dust without undue additions of cyanide and lead acetate. Various measures were tried to promote galvanic action and enliven this inert solution, but without success: and at this plant it was finally decided to revert to the older zinc-shaving method. The process has, however been retained at the other two properties mentioned. At Modderfontein B. only one of the two 40-frame, 52 in. Merrill presses installed is required to precipitate 1,900 tons of solution per day—an unusually high duty. The average gold content of the weaker solution treated is 2 dwt., and its cyanide strength 0.018 per cent. The consumption of zinc for the last six months at this mine (June to November, 1914, inclusive) was 0.180 lb. per ton of ore milled or 0.145 lb. per ton of solution precipitated. At Brakpan three 40-frame Merrill presses are in use, precipitating about 2,800 tons of solution per day. Here the consumptino of zinc during the last three months (September to November, 1914) is given as 0.152 lb per ton of solution precipitated and 0.251 lb. per ton of ore milled. The following details covering these three months' operations have been kindly submitted by the Brakpan Mines, Limited :—

	Tons Precipitated (Average per Day).	Gold Content of Inflow.	Gold Content of Outflow.
		Dwt.	Dwt.
Sand solution	269	3·952	0·045
Medium sand solution ..	769	1·548	0·056
Slime solution	1,791	1·271	0·048

	KCN Content Inflow.	KCN Content Outflow.	Alkalinity (CaO) Inflow.	Alkalinity (CaO) Outflow.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Sand solution	0·070	0·036	0·023	0·027
Medium aand solution ..	0·017	0·009	0·0146	0·015
Slime solution	0·010	0·007	0·0149	0·015

The consumption of zinc in the Merrill presses is approximately 1 10 lb. less per ton milled than in extractor boxes. The cost at Johannesburg of cut shavings is 4.2d. per pound, of zinc dust .93d. per pound, so that as regards zinc consumption the presses have the advantage. But this is offset by the cost of additional cyanide required to strengthen the slime solutions sufficiently for good zinc-dust precipitation, which was found to be, at New Modderfontein, 1d. per ton milled. The general opinion in regard to zinc dust, after three years' experience with the process, is that in effecting economies in zinc consumption and labour, and in affording a complete clean-up of gold, it has fulfilled the claims made for it. On the other hand, it requires more vigilance and care in manipulation than the zinc-shaving method, is liable to erratic fluctuations in efficiency without assignable cause, and requires the use of stronger solutions than are actually needed for dissolving purposes. One cannot escape the conclusion that zinc in any form is far from being the ideal precipitant for gold. In 1913 about 9,000,000 lb. of zinc were consumed by the mines of the Rand. When we consider that the greater part of this irrecoverable loss is due to the destructive method employed in separating the gold from the zinc after deposition, it is evident that the existing system is an extremely wasteful one. For this reason the subject of gold deposition presents one of the most profitable fields for investigation in the whole realm of metallurgy, and I venture to predict that in this stage in the reduction of gold ores, the most important advances in the future will be made.

CLEANING UP AND SMELTING.

Local methods of cleaning up the zinc-gold precipitate do not differ essentially from practice elsewhere. The difference in practice between local mining groups is one of minor details only, depending mainly on design and capacity of plant. Briefly, the procedure consists in periodic removal of zinc-gold "slime" and broken zinc or "shorts," and the renewal of the displaced zinc by fresh shavings. The amount of zinc removed from the boxes at each clean-up depends upon the balance desirable between monthly realization of gold and zinc consumption. A minimum of gold reserve in extractor boxes is attainable only at the expense of zinc consumption; hence the recorded fluctuations in the latter between 0·30 lb. and 0·50 lb. per ton of ore treated. The usual method of destroying the zinc in lead-lined tanks with sulphuric acid is in use on the Rand. A cheap source of sulphuric acid now in common use is the bisulphate of soda ($NaHSO_4$), a by-product from the local manufacture of sulphuric acid used in making nitro-glycerine. It contains about 30 per cent. of available sulphuric acid. Filter presses are in common use for removing the zinc sulphate from the gold slimes, and for the subsequent washing with hot water, preparatory to drying and smelting. The two methods of smelting followed on the Rand are (1) direct crucible smelting, and (2) lead smelting. The former possesses the important advantage of eliminating the gold absorption which takes place in the furnace bottom of the Taverner or lead furnace, and which is not recoverable until it is necessary to rebuild the furnace; on the other hand, the lead furnace costs somewhat less to operate. Both systems have their good points, and both will probably continue to be used as long as zinc is retained as the precipitant for gold.

PERCENTAGE EXTRACTION AND TREATMENT COST.

In concluding this paper a few remarks on extraction and cost of treatment on the Rand may be of interest. It is significant of the steady, consistent progress made in metallurgy during the last two decades, that the recovery of gold has risen from 60 per cent. or thereabouts (1890) to a maximum of 96 per cent. (1914). The chief contributing factors were: The introduction of slime treatment (1894); the advent of the tube mill (1904); improvements in classification (1907 to 1910); and finally the introduction of the vacuum slime filter (1909). Concurrently, many improvements in detail, both mechanical and metallurgical, have had much to do with the general advance. Similarly, in regard to the steady reduction in cost of treatment, many influences have been at work, such as improved efficiency achieved in crushing with heavy stamps and tube mills, improvements in design of plant and change in supervision and general organization. The cost of reducing ores on the Rand ranges between 2s. 10d. (68c.) per ton milled and 5s. ($1·20), depending upon capacity and efficiency of plant. As an instance of low reduction cost I have chosen the case of Modderfontein B., a modern, medium-size plant, showing first the average cost during 1913, when the tonnage was comparatively small, and during November, 1914, when the capacity of the plant had been increased.

Cost of Ore Treatment at Modderfontein B.—Average for 1913.

Average Tons per Month Milled = 33,715.

	Per ton milled.	
Ore sorting and breaking:		
Including white wages, coloured wages, coloured labour sundries, machinery and spares, sundry stores, workshops, power, and sundries	3·429d.	6·8c.
Transport from crusher station to mill bins:		
Including white wages, coloured wages, coloured labour sundries, stores, workshops, power, and sundries	0·918d.	1·8c.
Stamp milling:		
Including white wages, coloured wages, coloured labour sundries, mill spares, shoes and dies, water, sundry stores, workshops, power, and sundries ...	8·118d.	16·2c.

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* Paper read before the American Institute of Mining Engineers.

Tube milling:		
Including white wages, coloured wages, coloured labour sundries, tube mill spares, water, sundry stores, workshops, power. and sundries	7·890d.	15·8c.
Amalgamation:		
Including white wages, mercury, sundry stores, workshops, assaying, retorting, and smelting ...	2·163d.	4·3c.
Cyaniding:		
Including white wages, coloured wages, coloured labour sundries, water, cyanide, lime, zinc, chemicals, trucks, rails and fittings, conveyor belts, sundry stores, tailing contractor, workshops, power, assaying and smelting, stables, and sundries	19·554d.	39·1c.
Total	3s. 6·07d.	84·0c.

Cost of Treatment at Modderfontein B.—November, 1914.

42,000 Tons Milled.

	Per ton milled.	
Ore sorting and breaking	2·646d.	5·3c.
Transport from crusher station to mill bins	0·349d.	0·7c.
Stamp milling	8·754d.	17·5c.
Tube milling	6·251d.	12·5c.
Amalgamation	1·834d.	3·6c.
Cyaniding	14·531d.	29·0c.
Total	2s. 10·4d.	68·6c.

In closing this necessarily limited survey of Rand metallurgical practice, I must acknowledge having referred freely to those excellent sources of technical information, the *Transactions of the Chemical, Metallurgical and Mining Society of South Africa*, and the very complete *Text Book of Rand Metallurgical Practice.* I wish also to express my obligation to K. L. Graham and J. R. Thurlow, of the Rand Mines, Ltd., Metallurgical Staff, and to the Mechanical Engineering Department, for assistance rendered in the preparation of this paper.

STOPING METHODS AND DRILLING PROBLEMS ON THE WITWATERSRAND.—IV.

[By E. M. Weston.]*

Clearing the Holes.—An increase in drill speed of hammer drills over piston drills is no doubt theoretically due to the greater energy which can be imparted in a given time to a cutting edge by the greater number of blows delivered per minute in that form of drill, but it is also due to the fact that the system of passing water or air and water to the cutting edge does, in any except fairly steep down-holes. remove the broken fragments of rock more quickly and prevent energy being wasted in crushing them farther. The question arises, can the work of piston drills in drilling down holes in stoping be improved in this respect with any hope of gaining a notable advance in efficiency? There have been many attempts to employ hollow steel in piston drills to drill back holes, and there is at present a machine of this type being sold in America which has done very good work in tunnel driving, and there are feasible though expensive methods of doing this with drills of ordinary type. However, the wear and tear owing to the hard ground and the lack of skilled supervision for their operation makes it at present improbable that any type of piston drill for drilling wet upper holes can be evolved to compete successfully with hammer drills for that purpose. In drilling down holes with solid steel in a piston drill, the cuttings are subjected to a lot of re-cutting, to the detriment of drill speed, though they are surely and efficiently removed when small enough. Experiment and observation have, however, shown me that the whole theory of the design of rock drill bits as expounded in books and drill makers' catalogues is wrong. In them the point most insisted on is the necessity of allowing ample clearance between the wings of the bit for the ejection of cuttings. It was an Australian miner who first showed the absurdity of this arrangement. It is obvious when we consider it that the more we make the bit into the shape of a piston with small openings for the escape of water and cuttings, the greater will be the compression of the mud on the forward stroke and the more violent the ejection of cuttings. If six-pointed bits be employed in piston drills, an increase in drill speed is at once apparent. With hand sharpening it would have been too difficult to form such bits from solid round or octagon steel. Now, however, with machine sharpeners it is easy. This suggests a possible line of advance with the use of hollow steel in the smaller piston drills used in stoping. If the piston bit be formed and if the bottom of the chuck be bored out to provide escape for the cuttings, these in the form of mud are ejected in a most violent manner as soon as they are broken and they are not pounded up at all. The drilling speed is thus greatly increased. The way is opened for improvements in several directions, as no patents block the way. For instance, it is quite feasible to use 1¼ in. steel with a hollow core a half-inch in diameter, or 1½ in. hollow core or 1 in. steel with 5-16 in. hollow core. This means that the rock in the centre of the hole would be drilled round to form a core and broken off in large pieces, reducing the cutting necessary. Very little delay due to the central hole clogging is ever caused, and when ½ in. or ⅜ in. in diameter it never stops up. Provided machine sharpening is adopted, a much improved and stronger type of drill bit, with an outside reinforced circular cutting edge, can be employed. These promising developments could not be followed for some time owing to patent rights, but these have now lapsed. I was recently able to carry out experiments on a small scale with the best results. I had everything ready for a larger scale test under working conditions, but unfortunately the opportunity was taken away from me before I could produce working figures. The difficulties of carrying out and superintending such experiments while acting as a mine official are, however, very great. Bitter experience has shown me that any new development, however good, must be introduced gradually under one's own direct control with picked workers, who must then be employed to train others. Otherwise defeat is a foregone conclusion. One thing is, however, certain, apart from any such possible developments as have been sketched out. On the East Rand, for instance, with the present type of machine and steel, a small stope drill can drill 6 to 7 six-feet holes in one shift if too much time is not spent moving the drill; generally such efficiency is not being obtained. It can, however, be obtained by taking suitable measures; hence, in stoping practice, there seems yet no call to install machines of higher maintenance and operating costs. because the nominal drill speed may appear higher. Let us first find out the reasons for the inefficiency that exists and remedy it.

Value of Better Sharpening.—One general result, I think, emerges from this rather lengthy discussion. It is that progress in drilling must involve greater expenditure in the maintenance and sharpening of drill steel, and that the cost per ton of efforts in that direction, in comparison with possible gains in drilling speed, may be disregarded. I cannot, however, leave this subject without drawing attention to another striking example of the neglect of the conditions necessary for efficiency. I have written already on the necessity for anything like efficient results that the drill bit should be in a straight line with the axis of the piston. Assuming that the chuck and bushing of the rock drill are maintained in a proper condition, we must remember that nearly all drill bits are made by welding, and their straightness is judged by the eye only. Drills are continually being bent, and these again are straightened on an anvil by the most primitive methods. It is no exaggeration to state that the majority of drill bits now in use are not straight. There is no regular and systematic test to ensure that they are straight. The reason probably is that it would take time and money and the necessity of such a thing has never been considered.

Repair, Maintenance and Replacement.—Repair and maintenance, excluding cost of new machines, is generally given on a monthly basis. It varies from about 95s. 6d. per month in the case of a mine working large machines in comparatively soft ground to 210s. on a mine on the Central Rand working a large number of small machines. The cost per ton will vary from 3d. to 10d. per ton broken. This is a serious item of cost and when the question of rock drill replacement is considered, it deserves serious study in comparing the merits of hammer and piston drills. These considerations present themselves as being obvious:

1. The large 3¼ rock drill is a machine cheap to make and with a certain well ascertained and moderate expenditure it can be kept in a state of efficiency for a number of years. The expenditure of £5 or £6 per month renders it practically everlasting.

2. It is obvious that under the rough conditions and unskilful usage of mine work smaller drills of the same class, owing to their weaker construction, will cost somewhat more, but not very much more, to maintain.

3. With hammer drills, especially under the conditions in which they have to work on the Rand (being in the hands of natives and whites who have little or no mechanical knowledge), owing to a number of reasons they are more expensive in first cost, and owing to their lighter construction and more rapidly moving parts and the greater vibration and stresses set up by the greater evolution of energy in relation to their weight, they are bound to suffer more from wear and breakage. Grit is more easily introduced in most types, and when it is its presence does more harm.

4. When any system of introducing water to the base of hollow steel is employed, complication and risk of damage from water and rust are certain to be greater than with piston drills. Whatever the life of any type of water-feed hammer drill may prove to be, it will not approach that of a piston drill, and maintenance costs are much higher.

I recently saw some figures showing the total amount spent on spares and renewals for water-feed machines on one mine, and the amount certainly proved a serious addition to the tonnage costs

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*In the *Mining Magazine.*

broken over that period. On the other hand, I had more favourable figures quoted for other types. Mine accounts do not generally show if new drills are being bought as replacements or as renewals, and it requires often a thorough audit over a considerable period to obtain definite and reliable figures. With regard to the employment of water-feed drills, one needs to calculate what extra rate of boring speed or breaking efficiency has been gained, and then, taking all other costs into consideration, to determine how many pence per ton in this direct extra cost one can afford to spend to gain the results obtained, and if this has been exceeded. At present the hammer drill is winning its way in development because of quicker drilling and the more rapid progress made. In stoping, its sphere lies in back stoping areas that cannot otherwise be attacked. There is, however, another aspect of the question of repairs. If any drill is continually breaking down, whatever its nominal drill speed may be, its drilling power must be greatly reduced, or there must be a corresponding increase of capital expenditure to enable spare machines to be kept in a certain proportion to those working, as even an underground mechanic cannot always be on the spot to effect instant repairs, however valuable otherwise his services may be. It is evident that the matter of repair, maintenance, and renewal of rock drills may become a most important item of cost, or even one prohibitive to any progress under the unsatisfactory conditions of labour and the average hardness of rock on the Rand.

(To be continued.)

Consolidated Gold Fields Group.

The following are the particulars in regard to the outputs and profits for the month of September, 1915, of the undermentioned companies of the Consolidated Gold Fields group:—

Company.	No. of Stamps.	Tube Mills.	Tons Crushed.	Gold declared, Fine Ozs.	Total Profit.
Simmer and Jack ...	320	7	68,900	17,807	£28,511
Robinson Deep	150	10	52,400	17,682	24,278
Knights Deep	400	11	106,800	19,166	15,232
Simmer Deep	220	10	61,000	12,958	1,042
Jupiter G.M. Co. ...	80	5	18,600	2,901	—
Sub-Nigel	30	2	7,240	3,404	3,126
Totals	1,200	45	314,940	73,918	£75,187

The sundry revenue included in the above total declared profit is as under:—Simmer and Jack, £1,800; Robinson Deep, £227; Knights Deep, £21; Simmer Deep, £690; Sub-Nigel, £277; total, £3.015.

Jupiter G.M. Co.—Loss on working, £7,626; less sundry revenue, £938; net loss, £6,688. This company commenced crushing on September 1st. The loss on operations is due to absorption of gold in the plant which will also affect results for October.

C. M. and M. Society.

The ordinary general meeting of the Chemical, Metallurgical and Mining Society will be held in the Lecture Theatre, South African School of Mines and Technology, Johannesburg, to-night (Saturday) at 7.45. Election of new members: Mr. R. F. Blaikie, proposed and seconded by Messrs. H. S. Meyer and K. L. Graham; Mr. Leslie Ballesat Williams, by Messrs. Thos. B. Stevens and Jas. E. Thomas. General business: Discussion on notes previously read, etc. Paper for reading: " Clean-up Room Practice at the Simmer Deep, Ltd.," by Messrs. W. H. Jane and E. Davey (members). Replies to discussion: (1) " The Use of Scoop Discharges in Tube Mills," by Mr. W. R. Dowling; (2) " Notes on the Practical Testing of Working Cyanide Solutions," by Mr. Edward H. Croghan. Final discussion: " Notes on the Treatment of Antimonial Gold Ores from the Murchison (Transvaal) Range," by Mr. H. R. Adam. Continued discussion: (1) " Recent Investigations on Dust in Mine Air and the Causation of Miners' Phthisis," by Dr. James Moir; (2) " Cyanide Consumption on the Witwatersrand," by Mr. H. A. White; (3) " The Prevention of Hydrolysis in Cyanide Solutions," by Mr. H. M. Leslie.

Anglo-French Exploration.

By order of the Court, separate meetings of the holders of the preference and ordinary shares of the Anglo-French Exploration Company, Limited, were held on Wednesday in mail week at Salisbury House, E.C., for the purpose of considering a scheme for cancelling the preference capital. Mr. F. A. Robinson, who presided, observed that while the Board had for a long time past been of the opinion that it was desirable to deal with the preference capital, the difficulty had been to find a scheme which would be fair to both classes of shareholders and which could be carried through without the expense and inconvenience of reconstruction. As regarded the latter, their solicitors, Messrs. Coward and Hawksley, Sons, and Chance, had been able to devise a course of procedure whereby the legal difficulties had been overcome. It was clear that the great majority of the shareholders, both preference and ordinary, approved the proposals, as the number of votes received from both classes in favour of the scheme was simply overwhelming as compared with the very few against it. In the case of the preference shareholders they had received no less than 301,255 votes, out of which 299,564 votes were given in favour of the scheme, and only 1,691 against it, this small minority being represented by only seven shareholders. In the case of the ordinary shareholders, they had received 175,832 votes, out of which 175,581 were in favour, and only 251 against, the latter being represented by only three shareholders. The voting was, therefore, almost unanimous in favour of the proposals.

NOTICE: To Mine Managers & Others

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THE SEPTEMBER GOLD OUTPUT IN DETAIL.

Best Thirty-Day Return Since April, 1913—Some Notable Increases.

In September the Transvaal mines produced 776,750 ozs. of fine gold, valued at £3,299,423, as against 778,763 ozs., value £3,307,975 in the longer month of August, a decrease of 2,013 ozs., value £8,552. Last month's output is the best thirty-day return since April, 1913. In August last the precious metal was extracted at the rate of £102,662 per diem, while in September the daily average yield rose to £106,084, an increase of £3,422. This satisfactory state of affairs is mainly due to a substantial improvement in the native labour position, which has enabled the Witwatersrand to bring 108 more stamps into operation. The output figures for August and September were officially announced by the Chamber of Mines on Saturday as follows:—

WITWATERSRAND.

	Ozs.	Value.
August	749,572	£3,183,981
September ...	749,235	3,182,548
Decrease ...	337	1,433

OUTSIDE.

	Ozs.	Value.
August	29,191	123,994
September ...	27,515	116,875
Decrease ...	1,676	7,119

GRAND TOTAL.

	Ozs.	Value.
August	778,763	3,307,975
September ...	776,750	3,299,423
Decrease ...	2,013	8,552

The principal feature of the Witwatersrand returns is the re-appearance of the Jupiter in the list of producers. This mine ran 80 stamps during the month, producing 2,901 ozs. of gold, valued at £12,323. Although September contained one working day less than August, several companies increased their output. Among these are the Ferreira Deep, showing an increase of £8,007, Knights Deep £7,412, Knight Central £2,243, Simmer Deep £3,156, Consolidated Main Reef £1,627, Government Areas £1,325, New Modderfontein £1,784, Van Ryn Estate £1,104, Vogel Estate £1,736, and Wit. Deep £1,257. On the other hand, large decreases are shown by the Rose Deep (£10,314) and the Robinson Deep (£4,482). Increases were recorded by five of the outside mines, viz., Sub Nigel £819, Sheba £616, Worcester £110, Fairview £450, and Rietfontein £204.

THE STAMP POSITION.

In September 10,048 stamps were dropping on the Transvaal goldfields, as against 9,955 in August, an increase of 93. The official figures are as follows:—

	Rand	Outside.	Total.
August	9,407	548	9,955
September ...	9,515	533	10,048
Increase ...	108	—	93
Decrease ...	—	15	—

NATIVE LABOUR.

For the last three months the figures are as follows:—

	July.	August.	September.
Gold mines	190,026	196,866	204,833
Coal mines	9,371	9,943	9,743
Total	199,397	206,609	214,576

INDIVIDUAL RETURNS.

The following are the returns of the Witwatersrand mines:—

	Ozs.	Value.	Inc.	Dec.
Aurora West	4246	18036	—	64
Bantjes	5400	22938	—	[illegible]
Brakpan	20734	88072	—	1139
City and Suburban	12212	51873	577	—
City Deep	28489	121013	—	2592
Con. Langlaagte	16501	70092	34	—
Con. Main Reef	9879	41963	1627	—
Crown Mines	63057	267849	—	2319
Durban Roodepoort	3415	14506	—	178
Durban Deep	8732	37091	—	62[illegible]
E.R.P.M.	53196	225962	—	1525
Ferreira Deep	24668	104783	8007	—
Geduld	9360	39759	323	—
Geldenhuis Deep	16687	70882	—	981
Ginsberg	4189	17794	98	—
Glencairn	3384	14374	314	—
Government Areas	15710	66732	1325	—
Jupiter	2901	12323	12323	—
Knight Central	7434	31578	2243	—
Knights Deep	19932	84666	7412	—
Langlaagte Estate	14019	59549	—	1521
Luipaardsvlei	5672	24093	—	1253
Main Reef West	6741	28634	144	—
May Consolidated	2685	11405	365	—
Meyer and Charlton	8119	34487	123	—
Modder B	22787	96793	—	612
Modder Deep	14881	63210	807	—
New Goch	6909	29347	—	391
New Heriot	5549	23571	158	—
New Kleinfontein	16355	69472	—	1074
New Modderfontein	24604	104511	1784	—
New Primrose	4538	19276	—	272
New Rietfontein	487	2069	—	2986
New Unified	3318	14094	13	—
Nourse Mines	16449	69871	—	132
Princess Estate	6563	17878	—	922
Randfontein Central	54047	246568	—	2884
Robinson G.M.	18812	79908	—	2209
Robinson Deep	17682	75108	—	4482
Roodepoort United Main Reef	9362	31272	705	—
Rose Deep	18065	76735	—	10311
Simmer and Jack	15957	67781	—	5530
Simmer Deep	12045	51164	3156	—
Van Ryn G.M.	11215	47638	1104	—
Van Ryn Deep	18519	78664	—	484
Village Main Reef	12899	54791	—	782
Village Deep	18450	78371	—	845
Vogel Estate	3253	13818	1716	—
West Rand Central	670	2846	238	—
West Rand Consolidated	9211	39126	—	272
Witwatersrand	12509	53135	149	—
Witwatersrand Deep	12757	54188	1257	—
Wolhuter	10232	43463	—	277
Miscellaneous	—	7426	113	—

OUTSIDE MINES.

	Ozs.	Value.	Inc.	Dec.
Nigel	3220	13678	—	1533
Sub-Nigel	3708	15750	819	—
Barrett	356	1512	—	115
Sheba	2491	10581	616	—
Worcester	740	3143	110	—
Glynn's	1454	6176	—	1190
Transvaal G.M. Estate	7138	30320	—	846
Ceylon	47	200	—	734
Quest	652	2770	—	25
Fairview	880	3738	450	—
Rietfontein	366	1555	204	—
Miscellaneous	—	27452	—	4875

Printing, Bookbinding, Account Books, Tracing Cloth, Tracing Paper, Drawing Paper, Ferro Prussiate, Ferro Gallic, Indian Inks, Rubber Stamps, Stationery of all descriptions, Draughtman's and Surveyor's Requisites.

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TELEPHONE 2065.

Situation Vacant.

WANTED AT ONCE.—A Tip-Top Fitter for Supervising the Shops and Mechanical Repairs on the Dredge. Salary £35 for one month trial; if gives entire satisfaction, £40

Applications, with particulars and testimonials, to Andrada Mines, Limited, Macequece (Portuguese East Africa). Recommendations from firms known to Andrada Mines preferred.

GROUP PROFITS.

Following is a list of profits returned for July, August, and September:—

	July.	August.	September.
Central Mining	£268,153	£278,268	£269,962
Rand Mines	185,312	197,227	193,366
Gold Fields	78,719	75,764	75,187
East Rand Proprietary ...	55,548	56,049	55,011
Kleinfontein	24,222	23,027	22,339
Barnato	135,782	136,953	130,527
Albu	58,246	63,860	65,257
Neumann	50,672	49,152	50,986
Mines Selection	32,181	32,812	31,022
Goerz	48,679	49,076	49,311
Totals	937,514	962,188	942,968

CENTRAL MINING.

	July.	August.	September.
New Modder	£59,362	£56,234	£57,762
Robinson	41,070	41,160	38,403
Village Main Reef	24,097	26,009	25,668
Bantjes	1,304	2,701	1,112
City Deep	62,196	62,227	60,066
Modder B.	50,940	62,889	61,160
Village Deep	29,184	26,598	25,771

RAND MINES.

Crown Mines	101,531	97,118	95,515
Durban Roodepoort Deep..	5,829	6,212	5,850
Ferreira Deep	31,490	42,482	50,887
Geldenhuis Deep	10,353	11,576	11,484
Nourse Mines	12,627	11,437	11,095
Rose Deep	23,482	28,402	18,535

GOLD FIELDS.

Knights Deep	14,081	12,787	15,232
Robinson Deep	25,034	26,001	24,273
Simmer and Jack	32,565	30,132	28,514
Simmer Deep	5,000	4,343	4,042
Sub Nigel	2,039	2,501	3,126
Jupiter	—	—	*6,688

* Loss.

EAST RAND PROPRIETARY.

Angelo, Cason, Driefontein, New Comet ...	55,548	56,049	55,011

KLEINFONTEIN GROUP.

New Kleinfontein	24,222	23,027	22,339

BARNATO.

Consolidated Langlaagte...	31,677	31,531	29,024
Ginsberg	4,070	4,193	4,169
Glencairn	2,387	2,135	2,430
Government Areas	17,567	17,880	15,216
New Primrose	5,631	6,165	6,077
New Rietfontein	*441	930	—
New Unified	5,208	5,150	5,037
The Quest	354	520	420
Van Ryn Deep	44,507	43,330	43,119
Witwatersrand	24,822	24,819	25,035

* Loss.

ALBU.

Aurora West	4,123	4,073	4,039
Meyer and Charlton ...	20,037	20,489	20,767
Roodepoort U.M.R. ...	81	943	2,539
Van Ryn	16,244	19,442	19,599
New Goch	8,061	8,440	8,035
West Rand Consolidated...	9,700	10,473	10,278

TO LET ON TRIBUTE.

The Andrada Mines, Limited, intend to let out on Tribute the BRAGANZA MINE, situated in Mozambique Territory, near Macequece. The Company is now working the 3rd level, 400 feet, and developing the 4th level, 520 feet. The output of the Mine since the start has been £61,310, while during 1913, 1914 and the first six months of 1915 £47,000. Conditions of the Tribute can be obtained from the Andrada Mines, Macequece (Portuguese East Africa), on application.

NEUMANN.

	July.	August.	September.
Wit. Deep	18,352	16,068	—
Consolidated Main Reef ...	12,322	12,018	—
Main Reef West	4,334	3,697	—
Knight Central	2,596	3,348	—
Wolhuter	13,068	14,021	—

CONS. MINES SELECTION.

Brakpan Mines	32,181	32,812	31,022

GOERZ.

May Consolidated	1,042	1,029	1,031
Princess Estate	118	616	756
Geduld	12,645	12,768	12,778
Modder Deep	34,874	34,663	34,746

MONTHLY RETURNS.

The following table gives the monthly returns for the past four years:—

	1912. Ozs.	1913. Ozs.	1914. Ozs.	1915. Ozs.
January	737,060	789,390	651,753	714,984
February	703,886	734,112	626,261	676,229
March	*830,723	790,552	686,801	753,935
April	737,660	784,974	683,877	744,080
May	779,662	794,306	720,229	763,548
June	753,936	747,077	717,926	755,280
July	766,338	655,389	732,485	770,355
August	764,737	728,096	711,918	778,763
September	747,893	706,186	702,170	776,750
October	768,681	718,431	733,746	
November	757,337	673,486	715,836	
December	776,406	672,815	695,137	

* Including gold reserves extinguished.

1912. 1913. 1914. 1915.
Ozs. Ozs. Ozs. Ozs.

In connection with the recent anti-German riots on the Rand, several firms have commenced actions at law against the fire insurance companies. Amongst others, we note that the A.E.G. Co. are suing the London and Lancashire for £4,000, Alliance Assurance for £3,000, Liverpool and London and Globe for £4,000, Phœnix for £4,000, Royal for £7,000, and Northern for £3,000; also Orenstein, Arthur Koppel and Co. are suing the Union Assurance for £696, the Central for £1,374, the Liverpool and London and Globe for £2,945, and Lloyds for £2,262.

The Wolhuter Gold Mines,

LIMITED.

(Incorporated in the Transvaal.)

DIVIDEND No. 16.

NOTICE is hereby given that a Dividend of Six and One-Quarter (6¼) per cent. for the six months ending 31st October, 1915, equal to 1s. 3d, per £1 share, has been declared payable to Shareholders registered on the 31st October, 1915.

Dividend Warrants will be paid out as soon as practicable after the receipt of the London Transfer Returns to that date.

Holders of Share Warrants to Bearer are informed that they will receive payment of the Dividend on presentation of Coupon No. 16 at the London Office of the Company, Salisbury House, London Wall, E.C.

The Transfer Registers of the Company will be closed from the 1st to the 4th of November, 1915, both days inclusive.

By Order of the Board,
H. G. L. PANCHAUD,
Secretary.

Head Office, Johannesburg,
13th October, 1915.

Antelope G.M. Co.

The total tonnage developed at the Antelope during the June quarter was 9,731 (of which 4,694 tons resulted from an increase of the stope width) of the satisfactory value of 12 dwts. The tonnage milled was 12,090, of a value of 11·4 dwts. A very satisfactory feature is the continuance of good values in the 12th level, where the pay shute has lengthened out from 123 ft. to 249 ft.; the average width has increased from 59·2 in. to 61·6 in., and the average value of 14 dwts. compares with 15·7 dwts. Moreover, in the winze to the 13th level, which is now down 59 ft., and the rise to the 10th level, which is up 34 ft., the reef is stated to be looking well, and as a result 7,348 tons valued at 13·6 dwts. have been added to the ore reserves. Once more costs work out at 30s. 9d. per ton, which is still a long way ahead of the official estimate of 25s. Mining is 11d. lower at 6s. 2d., but some other expenses are higher, and for the first time royalty which works out at 2s. 2d. per ton is given separately; hitherto it has apparently been included in general expenses, which are now 3s. 6d., against 5s. 5d. at the end of March.

Shamva.

Although the tonnage treated at the Shamva in August was slightly less than the record figures for July the average value showed a very encouraging expansion. The recovery was as high as 16s. 2d. per ton, or 10d. better than the previous month, but working costs increased 6d., to 8s. 7d. per ton, and consequently the profit showed a reduction:—

		Recovery.		Working Costs	
	Tons.		per ton.	per ton.	Profit.
August	49,263	£39,287	16/2	8/7	£18,142
July	50,207	38,490	15/4	8/1	18,280
June	49,905	39,077	15/8	8/2	18,726
May	49,151	38,956	15/10	7/11	19,484
April	49,145	38,541	15/8	7/11½	18,956
March	48,370	33,398	13/10	8/4	13,250
February ...	39,408	30,831	15/8	8/11	13,199
January ...	48,043	31,472	11/10	7/9	12,657

Even with the sharp rise in expenses the average for the year to date is only 1½d. above that for the whole of 1914.

Sir David Harris announced at Kimberley last week that De Beers Company were endeavouring to help the Empire by making munitions of war. "We have told the British Government," he said, "that we will make no profit. We will merely charge cost of material and full day's pay for those men engaged in that work. It is not the first time we have done it, but I hope it will be the last, and that when this war is over our mines will be working full swing again, our men will be in receipt of full wages, and we shall be a happy, contented, and prosperous community."

HIGH MINING SALARIES.

Study for Certificates as Mine Captains, Mine Managers, Surveyors, Mechanical and Electrical Engineers, and Engine Drivers. Private Tuition and Correspondence Lessons, where personal tuition is impracticable. Practical Mathematics and Electrotechnics. E. J. MOYNIHAN, Consulting Engineer, Cuthbert's Buildings, Corner of Eloff and Pritchard Streets. Johannesburg. 'Phone 3664.

Nobel Dynamite Trust.

The scheme for separating the German assets from the British assets in Nobel Dynamite Trust, Ltd., was dealt with recently in Glasgow, at a meeting of debenture holders in Nobels Explosive Company, Ltd., Glasgow. Mr. Timothy Warden, presiding, said the Glasgow company in 1901 issued £500,000 four per cent. mortgage debenture stock, which was guaranteed by the Nobel Dynamite Trust, Ltd., of London, which company was practically the sole shareholder in the Glasgow Company. The war had precipitated a state of matters which made it imperative that the Trust Company should be disintegrated and the British assets separated from the German assets. The scheme was that the Trust Company surrender to the German shareholders the works in Germany, and in return the German shareholders give up a million and a-half sterling nominal ordinary share capital, the result being that everything which belonged to the Trust Company would be the property of Nobel's Explosives, Ltd., Glasgow. A speedy liquidation of the Trust Company was important from a national point of view because the feeling was general that the sooner they were free from contact with the German enterprise under the existing conditions the better. The meeting agreed that the guarantee of Nobel's Dynamite Trust be transferred to the Union Bank of Scotland.

* * * *

Cape Trade with Damaraland.

The attention of the Management Committee of the Capetown Chamber of Commerce has been drawn to the fact that German reservists captured in Damaraland before July 10, together with prisoners of war who had been brought to the Union, had been allowed to return to their several occupations and carry on their ordinary avocations as they had been doing before the war commenced; and they were purchasing stocks in Capetown to be sent to Damaraland for ordinary trade purposes. In addition the German banks were permitted to trade. The Standard Bank and the National Bank had opened branches at Windhuk, Walvis Bay, and Luderitzbucht, and the manner of carrying on the banking business as between Damaraland and the Union has been considered. The terms of surrender of German South-West Africa were dated July 10, and made provision for all prisoners of war to carry on their former trades and callings, so that in the opinion of the committee no action is advisable to be taken at the present time. Nevertheless, the committee will make further inquiries into this matter in due course, so that British trade shall not be handicapped. Information has been conveyed to the committee that the Provost-Marshal at Luderitzbucht has been instructed to issue no more permits for German traders to proceed to Capetown, but they may be granted permits to visit East London or Port Elizabeth. The decision seems to be inexplicable, particularly as Capetown is the nearest port to South-West Africa, and by the new arrangement an embargo is not only being placed upon the trade of Capetown, but also upon Damaraland, because of the higher sea freight charges from East London and Port Elizabeth, and also the fact that goods in most cases will be sent by rail via Upington from those ports at a considerably higher cost than from Capetown by sea. The committee has therefore made representations to the Government upon this matter, asking for information, and urging that the restriction referred to should be withdrawn.

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THE WEEK IN THE SHAREMARKET.

Steady With Little Business—Elections and War News Make for Quietness.

The proximity of the General Elections and the news from the Balkans have resulted in quiet markets during the week, though quotations remain fairly steady. The September output appears to have given considerable satisfaction in London, where the prominence lately given to the gold question has emphasised the importance of the Rand. The native labour supply remains very satisfactory, and in the absence of any untoward events the Rand gold output for 1915 should be almost up to the best. All the Far East Rand stocks remain steady, and will doubtless be the first to feel the effect of better news. The hope of the market is now that the result of next week's elections will reflect the good sense of the people of the Union, and that the present excellent tone and tenour of the news of the fighting in Europe will be maintained.

	Frid. 8th.	Sat. 9th.	Mon. 11th.	Tues. 12th.	Wed. 13th.	Thurs. 14th.
Adair Ushers	0 3*	—	—	0 3*	0 3*	0 3*
African Farms	6 10*	6 9*	6 9*	6 9*	6 9*	7 1*
Apex Mines	16 0*	16 3	16 0*	16 3*	16 3*	16 3*
Aurora Wests	8 0*	8 0*	8 0*	9 0	9 0	—
Bantjes Consolidateds	6 3†	—	6 3†	6 3†	6 3†	—
Brakpan Mines . . .	59 6	59 0*	60 0*	—	—	61 0*
Breyten Collicries . .	—	—	20 6*	—	—	—
Brick and Potteries .	5 0*	5 0*	5 0*	5 0*	5 0*	—
British South Africa	—	—	—	—	—	7 6*
Bushveld Tins	0 3†	—	—	0 3†	0 3†	0 3†
Cassel Coals	19 0*	19 0*	19 0*	19 0*	19 0*	19 0*
Cinderella Cons. . . .	—	—	2 9*	—	—	—
City and Suburbans	—	—	40 0*	—	—	41 3*
City Deeps	62 0*	63 6†	62 0*	62 0*	62 0*	61 0*
Cloverfield Mines . .	5 5	5 5*	—	—	—	5 3*
Clydesdale Collieries	12 0*	12 0*	12 0*	12 0*	12 0*	12 0*
Con. Investments . .	—	—	14 6*	14 6*	14 6*	14 9*
Con. Langlaagtes . .	37 3*	37 0*	37 0*	37 6*	37 6*	37 6*
Con. Main Reefs . .	18 3*	18 3*	18 3*	18 6*	18 6*	18 3*
Con. Mines Selection	—	—	9 3*	—	—	—
Coronation Collieries	25 0*	25 0*	25 0*	25 0*	25 0*	25 0*
Coronation Freeholds	0 4†	0 4†	0 4†	0 4†	—	—
Crown Diamonds . .	1 0*	—	1 0*	—	—	—
Crown Mines Deb. .	£98*	£98*	£98*	£98*	£98*	£98*
East Rand Centrals	2 6*	3 0†	2 6*	—	—	2 6*
East Rand Coals . . .	1 11*	1 11*	1 11*	1 11*	1 11*	—
East Rand Deeps . .	1 3*	1 3*	1 3*	—	1 3*	1 3*
East Rand Prop. . .	21 0*	21 9*	21 6*	21 6*	21 6*	22 0†
East Rand Deb. . .	£86*	£86*	£86	£86†	£86†	—
Eastern Golds	1 3*	1 3*	1 3*	1 3*	1 3*	1 3*
Frand Smith Diam.	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Geduld Prop.	32 0*	32 3	31 9*	32 0*	32 0*	32 3*
Glencairns	2 1*	2 1*	2 1*	2 1*	2 1*	2 1*
Goerz and Co. . . .	—	—	—	12 0*	12 0*	12 0*
Govt. Areas	23 6	23 3*	23 0*	23 3*	23 3*	23 6
Jupiters	6 6†	—	5 6*	—	—	5 6*
Klerksdorp Prop. . .	1 4*	1 4*	1 9†	1 9†	1 9†	1 4*
Knight Centrals . .	9 3	9 6*	9 7*	9 5	9 5	9 7*
Lace Prop.	3 3*	3 3*	3 2*	3 3*	3 3*	3 3*
Luipaardsvlei Est. .	7 0*	7 0*	7 3†	7 0*	7 0*	7 3†
Lydenburg Farms .	3 6*	3 10*	3 9*	3 10	3 10	3 9*
Main Reef Wests . .	6 7*	6 6*	6 6*	6 6*	6 6*	—
M.R. West Deb. .	£67½†	£67½†	—	£70†	£70†	—
Meyer and Charltons	—	—	—	102 6*	102 6*	102 6*
Middelvlei Est. . . .	1 0*	1 3*	1 3	1 3*	1 3*	1 3*
Modder B.'s	106 9*	107 6*	108 0*	108 0*	108 0*	111 0*
Modder Deeps	95 6*	96 0	—	95 9*	95 9*	97 0*
New Boksburgs . .	0 10*	—	0 10*	0 10*	0 10*	0 10*
New Eland Diamonds	10 0†	10 0†	—	—	—	10 0†
New Era Con. . . .	6 9	6 6*	6 9†	6 9†	6 9†	6 9†
New Geduld Deeps .	2 3*	2 4†	2 4*	2 3*	2 3*	2 3*
New Kleinfonteins .	23 3	23 3*	23 3*	23 0B	23 0B	23 6*
New Modderfonteins	305 0*	300 0*	302 6*	302 6*	302 6*	302 6*
New Primrose . . .	—	8 0*	—	8 0*	8 0*	8 0*
New Rietfonteins. .	—	—	—	0 6†	0 6†	—
New Unifieds	—	17 0†	—	15 6*	15 6*	15 9*
Pretoria Cements. .	42 6*	—	—	—	—	43 0*
Princess Estates . . .	—	2 9*	3 0*	3 6*	3 6*	3 6*
Rand Klip	3 9*	3 9*	3 11	3 10*	3 10*	3 11*
Rand Nucleus	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps .	2 7*	2 9*	2 9*	2 9*	2 9*	2 9*
Randfontein Est. . .	12 9*	13 0†	13 0*	12 0*	12 0*	12 6†
Robinson Deeps . . .	—	—	—	—	—	20 0*
Rooibergs	15 0†	15 0†	15 0†	15 0†	15 0†	—
Roodepoort Uniteds .	2 6*	2 6*	3 0*	3 0*	3 0*	3 0*
Shebas	2 0†	1 9*	1 9*	1 9*	1 9*	—
Simmer Deeps . . .	—	2 0†	—	—	—	—
S.A. Breweries . . .	30 6*	31 0*	31 0*	31 0*	31 0*	31 0*
S.A. Lands	2 6*	2 7*	2 6*	2 6*	2 6*	2 7†
Springs Mines	24 9*	24 9*	24 6*	24 6*	24 6*	25 6
Sub-Nigels	10 0*	—	11 0†	—	—	—
Trans. Coal Trust . .	—	37 0*	37 0*	37 9*	37 9*	37 6*
Transvaal Lands . .	—	—	—	10 0*	10 0*	—
Trans. G.M. Estates	25 0*	27 0*	27 0*	27 0*	27 0*	—
Van Ryn Deeps . . .	49 6*	50 3	50 3*	50 6*	50 6*	50 3*
Village Deeps	35 0†	33 6*	35 0†	35 0†	35 0†	35 0†
Vogel Con. Deeps . .	—	0 7*	—	—	—	—
West Rand Cons. . .	6 6*	—	—	—	—	—
Witwatersrands . . .	50 0*	51 0*	50 0*	51 0*	51 0*	51 6*
Wit. Deeps	27 0*	27 3*	27 0*	27 3*	27 3*	26 9*
Wolhuters	12 0*	11 9*	12 0*	12 0*	12 0*	12 3*
Zaaiplaats Tins . . .	14 3*	—	14 6*	14 6*	14 6	14 6

A Ex London. B Odd lots. * Buyers. †Sellers.

A Ex London. B Odd lots. * Buyers. †Sellers.

The first electric battleship will be the 30,000-ton California now building at the Brooklyn Navy Yard. This great warship will be driven by powerful electric motors and in addition to this electricity will be used for steering, hoisting ammunition, turning turrets, operating winches, for ventilating apparatus, for signalling, wireless communication and for cooking the daily meals for the officers and crew. The California is the first large battleship to be equipped with a complete electrical system. The excellent results obtained with the collier Jupiter induced the Government to adopt this novel method of propelling its latest new super-dreadnought. The contract for the propelling equipment for the California has been recently awarded to the General Electric Company. The apparatus will cost about 431,000 dols. as against an estimate of 631,000 dols. for propelling by steam. The equipment includes two 18,000-h.p., 2,200-r.p.b. turbine generators and four induction motors. The maximum speed of the ship will be 22 knots per hour. It is estimated that 75 per cent. of the power generated by the turbines will be delivered at the generator, and that there will be a loss of only 8 per cent. in the electrical equipment. The efficiency of electric drive is far ahead of that of the most efficient steam drive now in existence on any of the large Atlantic liners. A feature of electric propulsion not obtainable with steam propulsion is full power in backing. Full speed astern with electric propulsion means almost as many knots per hour as full speed ahead. This is an important military feature. If successful it promises to revolutionzie the present methods of propelling all our warships.

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

A Boom in the Demand for Wire Ropes—An Old Lot of Linseed Oil in the Market—Small Battery Spares Wanted—Big Line of British Wire to Hand.

The feature of the week—in fact, it might well be described as the sensation of the week—was the pronounced calling for tenders for wire ropes, chiefly by one of the leading mining houses. Experienced brokers state that never before in the history of the Rand have so many tenders been issued simultaneously. The wire ropes are not for immediate delivery, but extend over a period of six to nine months, which will give the oversea manufacturers the opportunity to tender in advance. The estimates of the aggregate values vary up to a total of £100,000, and the period for which the supplies will suffice is given at about two years. From time to time mail advices have explained the difficulty of obtaining regular supplies of wire ropes, as the Admiralty has the first call upon the whole British output, and their requisitions of late have been exceptionally heavy. These mail advices have now been confirmed and emphasised by cables, hence the anxiety of the mines to secure stocks well ahead of their ordinary requirements, and something over to guard against unforeseen happenings.

The seriousness of the Balkan question was almost overshadowed by the wire rope tenders, although one was often connected with the other, and many a doleful half-hour's chat was indulged in, as it was thought the expansion of the big war meant a longer period of waiting for a real revival in business, which is generally admitted cannot be expected until signs become somewhat pronounced—of the end. A hint has been received of several nice orders, amounting to a few thousand pounds each, being secured by a Johannesburg firm for a place at a distance, which to-day is only natural, considering that for many goods, during the war at any rate, we have become a great and leading centre for the whole of South Africa. The elections have created a frame of mind amongst the farmers which has quite shattered the country trade for both new and second-hand agricultural materials, as well as second-hand building material for sheds and other farm outbuildings. There are a few prospectors out, as there are enquiries from London for tin, copper and other base metals, also asbestos propositions. One discovery has been reported in the Pretoria district of a sulphur proposition. Further, several prospectors went alluvial diamond digging in the neighbourhood of the Pretoria Premier Mine, but had to give it up, as the diamonds found could not be sold at anything like pre-war values.

Bolts, Nuts, Iron and Steel.

At a meeting of those concerned, the price of nuts and bolts has been advanced all along the line, according to sizes, the increase averaging about 5s. per 100 lbs. Iron and steel have not be affected so far, but it is anticipated that the superdemand for wire ropes will pull other mining materials up to higher levels. There has been a slight decrease of a penny per lb. in solder, simply because stocks are heavy, and weak holders have to sell. There has been some talk about producing steel in Johannesburg; well, so far a fair amount of success has accrued by one firm making steel castings instead of iron ones.

Timber.

Prices and business are much the same in the timber trade. The established factories in Johannesburg and suburbs continue in good swing in producing all kinds of doors, frames, windows, and similar things, at one time so profusely imported from Norway and Sweden. The local makers of cases are scouring the reef districts to buy up bargains in any kind of wood, both new and second-hand, to make packing cases, which has become a very decent industry in our midst. Second-hand scantling, 9 x 3, is freely sold at 6d. per foot, and all second-hand timber, in anything like condition, is getting dearer as the demand for houses of all descriptions, taken in the broad sense, is so good that people are not pulling down old houses, but rather patch and paint them up for immediate letting purposes. Second-hand galvanised iron is from 5d. to 6d. per foot, and not too much available.

Linseed Oil, Paints, Lead, etc.

The standard price of raw and boiled linseed oils is from 21s. to 22s. 6d. per 5-gall. drums, but there is a lot of raw linseed oil come unexpectedly out of a coast warehouse into the South African market, which is being offered in big drums (other than 5 galls.) as low as 18s. 6d. per 5 galls. This raw oil is just now rather a drug in the market, whereas the boiled description has a ready sale, now this raw article cannot be turned into boiled oil in this country, as the process is a difficult one, and expensive machinery and vats have to be provided. All paints and oils for use in house work have a tendency to advance, as business continues so brisk right through Johannesburg, the suburbs and the Reef, as the outsides of buildings are being repaired and painted as quickly as possible in anticipation of the rainy season and the coming of Christmas.

Second-hand Machinery and Materials.

There is a big demand for tram trucks and rails (16 lbs.). In consequence of the scarcity, fancy prices have been asked and paid, so that work in progress can be pushed forward. Fair enquiry exists for small batteries and driving power for same, from the Northern Transvaal and Southern Rhodesia. There is a great shortage of small battery spares, also 3in. stems, because the big producing mines are not using nor buying stamps under about 1,250 and 1,500 lbs. weight, which obviously requires correspondingly heavier parts; therefore, up to the present the smaller batteries have been using old stocks, which are now pretty well absorbed, and it has been suggested that it might be worth some merchant's while to specially import the smaller spares, as many second-hand small batteries are coming into use, with increasing prospects. At the moment, only a very few actual sales are taking place, although constant enquiries come from Lydenburg and Pilgrims Rest districts.

Electrical Goods.

Wiring has fallen in price about 2s. 6d. per coil of 320 and 322. One firm alone received a total of 35 miles of these two sizes of wire, during the present week, from British manufacturers. However, the larger sizes are still scarce, and quotable prices are not over-reliable, as it is usually a questioning of bargaining, or even borrowing, from one good firm to another until supplies arrive. Now that ordinary electrical goods have become fairly plentiful, many more jobs have been given out, for although at the beginning of the week the worrying about the Balkan war news cast a certain gloom over business, yet another view was taken pretty unanimously that it will serve no good purpose in waiting indefinitely; therefore, we had better go on quietly with any work previously arranged for.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; mild steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in., 6d. per lb.; ½ in. up to 2 in., 45s.; 6 in., 37s. 6d.; over 6 in., 35s. 6d.; ⅝ in. up to 2½ in., 35s.; over, 33s. 6d.; ¾ in. up to 2½ in., 36s.; over, 32s. 6d.; ¾ in. up to 2½ in., 32s.; over, 30s.; ⅞ in. and 1 in., 29s., all per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 45s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7¼d. to 7¾d., 11 ft. 8¼d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6d., 9 ft. 6¼d., 10 ft. 6½d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9½d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 32s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton, on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 21s. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 42s. 6d. 2/5 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 11s. 11d. 2/5; petrol, 22s. 2/5; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb , according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; radiator lamps, 4s. 6d. each; double pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.: tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

New Patents.

204. Raymond McDougall.—An improved device for holding and detachably securing war ribbons and like decorations to garments.
205. Albert Edward Mansfield and Henry William Michler.—A new or improved artificial manure or fertiliser.
206. Andre Gabriel Flurian.—Improvements in drills and drill bits for rock-drilling.
207. John George Robinson.—Improvements in steam superheaters for locomotive and other fire tube boilers.
208. Wubbo van der Molen and Anthony Richardson.—Improvements in washing, grading, and concentrating apparatus for ores and precious stones.
209. William David Williams.—An improved water spray for use in mines and the like called a vapour spray and water blast.
210. Noel Yeo Robertson and Herbert Moss.—Improvements in rollers, idlers or pulley for supporting, hoisting, hauling and like ropes, conveyor belts and the like.
211. James Richards.—Improved wire cutting apparatus to attach to rifles and the like.
212. William Henry Thomas.—A new or improved ointment or curative preparation.
213. William Henry Thomas.—Improvements in cleaning or staining and polishing preparations for boots, shoes, and other leather goods.
214. Frederick Charles Isaac.—Improvements in means for reducing vibration in cam shafts of stamp mills and the like.
215. Harry August Stockman.—Improvements in wheels for road vehicles, pulleys and the like.
216. George Hay Dale.—Improvements in or relating to tents.
217. George Alfred Julius.—Keyboard controlled machine for printing tickets and recording issues thereof.
218. George Alfred Julius.—Improvements in totalisators.
219. Andrew Cyril Webber.—Improvements in pumps for moving sand pulp and the like.
220. Leslie Hamilton MacCallum.—Means for locking mechanisms for alternative movement.
221. Robert L. Doran.—Improvements in lamps.
222. Oliver Trevillion Jenkins.—Improvements in welding hollow rods.
223. Leonardus Wessel Wemmer.—Dorothy cooler.
224. Charles Henry Perrins and Abraham Zwarenstein.—A new and improved method and means of blasting.
225. Henry Samuel Potter.—Improvements in chucks for hammer rock drills.
226. Johannes Lodewicus Pretorius de Beer.—A cure for rheumatism for human use.
226. Johannes Lodewicus Pretorius de Beer.—A cure for rheumatism for human use, to be applied externally.
223. Edgar Allen & Co., Ltd., and Hugh Donald Boyd.—Improvements in central buffers and couplings for railway and the like rolling stock.

For Sale.

Three pair Holman Pneumatic Stamps, No. 1 size, complete. Pair undertype Robey Winders, 14½" Cylinders, Boiler 100 lbs.

Pair modern Horizontal Winding Engines, drop valves, Cylinders 22" by 48" stroke, Drums 8′ diameter, Wellman Friction Clutch for high speed and high pressure. Several Air Compressors from 100 feet to 1,100 feet per minute. Whole of the above plant, second hand, but in fine condition, recommended. Enquiries solicited for all kinds of Mining, Contractor's and Works Plant. Very large stocks for immediate delivery, low prices. Wagons, Rolling stock of every description. **JOHN F. WAKE, Geneva Engineering Works, Darlington, England.**

The Week's Meetings.

NATIVE RECRUITING CORPORATION

Third Annual Meeting.

At the third ordinary general meeting of the Native Recruiting Corporation, Ltd., held in the Corporation's boardroom, General Mining Buildings, Johannesburg, on Monday, the 11th October, 1915, there were present: Messrs. F. G. Roberts (in the chair), D. Christopherson, W. Dalrymple, Samuel Evans, A. French, A. G. Gill, F. R. Lynch, J. Munro, H. Newhouse, F. Raleigh, J. F. Rutherford, S. C. Steil, E. A. Wallers, H. M. Taberer, and E. E. Martienssen (secretary).

In moving the adoption of the report and accounts for the year, the Chairman said: The report and accounts submitted to you to-day cover a period of twelve months from the 1st July, 1914, to the 30th June, 1915. These have been in your possession for several days and it will, therefore, be unnecessary for me to do other than deal with the more salient features. At the outset I may say that the results achieved by the Corporation during the period under review have been extremely gratifying and successful. Dealing first with the balance sheet, you will observe that the registered capital of the Corporation remains unchanged. The amount called up per unit of complement at the 30th of June remained at 7s. 6d., leaving, at that date, 12s. 6d. per unit of complement still available to be called up if required. The amount under the heading of "Creditors" has been reduced by the repayment to the Witwatersrand Native Labour Association of £25,000 at the beginning of 1915, being the balance of the loan of £75,000 obtained from that Association in 1913. Turning to the receipts and expenditure statement, it will be noted that the administration charges show a slight reduction as compared with the previous year, the figures being £72,035 12s. 10d. as against £73,386 0s. 8d Early in 1915 the Witwatersrand Native Labour Association reduced the primary charge on account of the cost of recruiting East Coast natives, and your board decided to make an approximately corresponding reduction for natives supplied to members by the Corporation. In addition, it was found possible to refund to members on the basis of fees paid by them the rebate of £8,785 18s. 11d. received from the Witwatersrand Native Labour Association, and also the accumulated difference between the actual cost of recruiting and the initial, or arbitrary charge which had been made therefor to the end of the financial year. The total amount which has been thus refunded to members in reduction of the cost of recruiting is £119,133 2s. 3d., and it will be observed that in the receipts and expenditure statement there remains no balance to be carried forward to the current financial year. The distribution of this sum of money necessitated the calling up of a further 2s. 6d. per unit of complement, so that there now remains 10s. per unit still available to be called up. The report of the board of management and the annexures thereto give very full particulars regarding the operations of the Corporation, but I think it opportune to draw your attention to the gratifying manner in which the number of natives recruited by the Corporation has increased. During the period under review 94,295 natives were recruited by it, or an average of 7,858 per month; during the 12 months July, 1913, to June, 1914, 60,092 natives were recruited, or an average of 5,008 per month; and in the first nine months of the Corporation's existence (that is, from the 1st October, 1912, to the 30th June, 1913), 51,586 natives were recruited, or an average of 5,732 per month. You will, therefore, observe that the average per month has increased to 7,858 from 5,732. On the other hand, it is to be regretted that the number of natives coming direct from their homes on their own initiative to engage "voluntarily" with the mines has not increased in proportion. Excluding East Coast natives, the total number of new natives engaging themselves voluntarily with members during the period under review was 26,739, or only 20.7 per cent. of the total number of new natives coming forward to work and distributed to members, while during the period July, 1913, to June, 1914, the number of these so-called "voluntary" natives was 26,187, or 28.2 per cent. as compared with the 20.7 per cent. just referred to. The position of the native labour force at the end of the financial year under review showed a considerable improvement as compared with the position at the end of the preceding year, the general average percentage of underground complement employed by members on those dates being 78.70 per cent. and 70.55 per cent. respectively. This percentage has continued to increase and at the end of last month (September, 1915) it stood at 89.86 per cent. This unique position is, no doubt, due to a combination of circumstances in which the absence of industrial unrest, poor seasons in the native territories and, to a lesser extent, the war and the consequent closing of the diamond mines, all form part. In regard to the distribution of natives amongst the members of the Corporation, your chairman, at the last annual meeting, stated that this matter had been placed on a much more satisfactory basis. It is, therefore, interesting to note that the chart for this period, when compared with that of the previous year, clearly illustrates the accuracy of his remark. With a view to placing the matter of the equitable distribution of native labour on a still better basis, the executive committee of the Transvaal Chamber of Mines, acting in co-operation with the board of management of the Witwatersrand Native Labour Association and your board, appointed a committee, towards the end of 1914, to assess the native labour requirements of each mine. This work, so far as underground complements are concerned, has recently been completed and the figures arrived at have been adopted with certain minor reservations by the Witwatersrand Native Labour Association and the Executive Committee of the Transvaal Chamber of Mines. During the period under review, your board have, as far as possible, investigated and given effect to those recommendations contained in Mr. Buckle's report on Native Grievances which lay within their scope. A scheme has been put into operation whereby natives arriving on the Rand in an unfit condition are sent to the Witwatersrand Native Labour Association's Hospital for treatment with the object of restoring their health. Arrangements have also been made for repatriating unfit British South African natives to their homes when they are able to undertake the journey, and your thanks are due to that Association for their kind co-operation and assistance in these matters. The health of the natives employed on the mines continues to improve, and during the period July, 1914, to June, 1915, the number of natives incapacitated through sickness per 1,000 per day on all gold mines was 9.70 as compared with 10.19 for the period July, 1913, to June, 1914. The Corporation's Remittance Agency, through which natives may remit money to their homes free of all charge, is becoming increasingly popular. During the period under review the average sum of money remitted per month was £3,000 as against £2,000 during the financial year July, 1913, to June, 1914. There is ample reason to believe that the natives greatly appreciate the interest which the Corporation and its staff take in their welfare. At about the middle of last year your board co-operated with the Transvaal Chamber of Mines, the Witwatersrand Native Labour Association and one or two other bodies in assisting to finance and properly establish a staff benefit society. This society has, so far, proved very successful, and its existence is very much appreciated by the parties concerned. In July last your chairman, Mr. C. W. Villiers, expressed his desire to proceed to Europe to join the Imperial Forces and, having obtained leave from your board, he has carried out his wish and is at present serving his country at the Front. A number of the head and branch offices' staff have also been animated by this same spirit, and, as your board granted all reasonable facilities, the Corporation's employees are represented in both the Union and Imperial Forces. In this connection, it is not out of place to refer to the very gratifying attitude of the natives on the Rand in regard to the war. Many of them have become spontaneously animated with a desire to assist the cause, and some time ago they approached your General Superintendent with a request that he should assist them in organising a native fund for this object. During the year it has been the misfortune of your board to be deprived of the services of Sir George Farrar who, as you are aware, died while on active service in South-West Africa with the Union Forces. Sir George always took the greatest interest in the affairs of the Corporation, and his great knowledge and experience have been of the utmost value in finding a solution of the many difficulties with which your board has been confronted from time to time since the inception of the Corporation. The thanks of your board are due to the Consulting Engineers' Committee for their valuable advice. During the past year the Chairman of that Committee has attended the meetings of your board and his presence has been of the greatest assistance. In this connection it is desired to place on record your board's appreciation of the services of the secretary of that Committee, Mr. A. W. Stockett, who, very much to the regret of your board, resigned his position some few weeks ago in order to settle in America. On behalf of your board, I wish to thank the staff of the Corporation for their loyalty and energy, and I also desire to express appreciation to the Native Affairs Department, the Director of Native Labour, the mine managers, the compound managers, the Transvaal Chamber of Mines and the Witwatersrand Native Labour Association for their courteous and willing co-operation and assistance during the period under review. I now beg formally to move the adoption of the report and accounts as submitted.

The report and accounts were adopted.

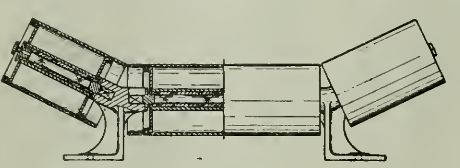
Messrs. Howard Pim and Hardy were re-appointed auditors for the current year.

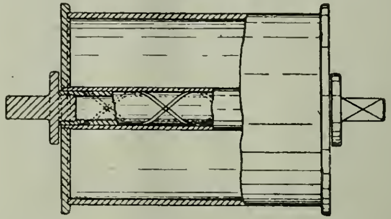
Engineering Notes and News.

A NEW SELF-LUBRICATING ROLLER.

Exceptionally Low Rotating Weight and Large Bearing Surface—Automatic Lubrication.

Some few months ago we had occasion to remark upon a new self-lubricating rope roller which was being handled by Messrs. Robertson and Moss, and we are now able to bring to the notice of our readers a new roller invented by the firm mentioned which embodies considerable improvements upon any previously known roller. The chief points among these improvements which will appeal to mining men, are the reduced rotating weight—making for the easy starting and stopping of the roller and consequent reduced wear upon the rope—and the greatly increased bearing surface which runs the entire length of the roller. The spindle, which is of unusually large diameter, is stationary, and being hollow, is filled with a special lubricant, thus making the roller self-lubricating and with hardened bearing surfaces and rope thread it is capable of an exceptionally long life without any attention whatsoever. The projecting ends of the spindle are square—a novel feature—and whilst the rollers can be fitted into and used in existing frames, such are not essential, as hardwood blocks, made from scrap timber, fill the bill to a nicety and are responsible for a minimum of outlay. These rollers are being manufactured locally under the supervision of the patentees, and this fact enables individual engineer's ideas to be easily incorporated to suit special requirements. The rollers have been adapted for use in connection with conveyor belts. We understand that the price asked for these rollers compares very favourably with others upon the market, and that Messrs. Bullivant, of rope fame, have undertaken the representation of the roller as regards reef sales. Messrs. Robertson and Moss, of Trust Buildings, Johannesburg, will be pleased to give any further information in connection with rollers beyond what is possible in this brief notice.





PREPARATION OF LARGE-TYPE BOILERS FOR TEST—I.

[By H. Marten.]*

In submitting this paper to the Institution, I propose to describe the preparation of large marine-type Babcock and Wilcox boilers for some recent tests, with notes on the operation of these tests, concluding with an outline report on the V.F. and T.P. Co.'s last official "taking-over" test at Brakpan Power Station. It is necessary to observe the following particulars regarding the construction of the boilers in order to appreciate the necessity for the apparatus fitted and described. From the accompanying side elevation it can be seen that, apart from the furnace arrangements, the boilers are made up of three main parts namely, the economiser, the boiler drum and water tubes, and the superheater—which all combine in the process of generating superheated steam at 205 lbs. per square inch pressure and 360 deg. C. temperature from the feed water pumped from the hot wells. The economiser is the usual Babcock and Wilcox type, with tubes expanded into headers, the gases being baffled to meet the tube surfaces as designed. The chief part consists of a long horizontal boiler drum with its water tubes as shown, the latter being also baffled to effect a suitable flow of the furnace gases. The superheaters are simply made of long U-tubes expanded into header boxes, and are also suitably baffled. The Brakpan boiler under test has 3,610 square feet of economiser heating surface, the main drum and tubes have 6,200 square feet, and the superheater 2,333 square feet. The grate area is 252 square feet, giving 24.6 square feet of main boiler heating surface per square foot of grate area. These boilers are guaranteed to deliver 36,000 lbs. of superheated steam per hour at a pressure of 205 lbs. per square inch, with a 1-inch draught at the boiler uptake, burning a good quality of Transvaal slack. On the most recently fitted test boiler preparations were made for the following observations and operations:—(1) Quick and accurate feed water measurement. (2) Clear and definite observation of the gauge-glass levels. (3) Simple but accurate coal weighing. (4) Thickness of coal fed on to the grates. (5) Speeds of the grates. (6) Careful sampling of, and allowance for, coal taken for grading and analysis. (7) Ready weighing and allowances for unburnt riddlings dropped through the chain grates. (8) Quick quenching, easy weighing, and careful sampling of the ashes. (9) Accurate pressure gauge readings. (10) Nine reliable temperature observations as follows:—(a) Temperature of boiler-house atmosphere; (b) temperature of economiser inlet water; (c) temperature of economiser outlet water; (d) temperature of uptake flue gases—i.e., economiser outlet; (e) temperature of economiser inlet gases; (f) temperature of steam delivered from boiler; (g) temperature of superheated steam in the header; (h) temperature of superheated outlet gases; (i) temperature of superheated inlet gases. (11) Furnace temperatures. (12) Draught in the uptake flue. (13) Draught over the furnaces. (14) Convenient and frequent sampling and analysis of the uptake flue gases. These observations are made by means of apparatus which is arranged and used as follows:—

(1) *For the Feed Water Measurements.*—A branch pipe is carried from the main feed range to deliver through a stop valve and hand-regulating cock to a large square weighing tank, braced internally to prevent bulging, and resting on a 5,000-lb. Avery scale. The weighing tank and scale are supported on a platform, and a delivery pipe with a stop-cock is arranged to supply the feed tank below, to which the suction pipe of an ordinary Weir feed pump is connected. The operator is kept accurately informed of the water levels in the feed tank by means of a float and rod, which can be observed at the same time as the balance lever of the scale. Quick and accurate filling and weighing are facilitated by means of a gauge glass on the weighing tank, which is marked by an adjustable indicator when the first tank is weighed out. The pump delivery is connected through a stop valve to the boiler inlet check valve. The main feed range, however, is, of course, directly connected to the boiler inlet through a reliable isolating valve, by means of which the test feed pump and tanks are bye-passed when the boiler is not operating under test. The general arrangement is shown diagrammatically on the drawing. In operation during a test, after closing the isolating valve and testing it for leakage, checking the scale, and fixing the true weight of the tank, etc., successive weighed amounts of, say, 3,000 or 4,000 lbs. are run into the feed tank. On reaching a certain marked level after receiving each measured quantity into the feed tank the exact time is noted, indicating the period taken to feed such quantity into the boiler. (2) The gauge glasses and fittings are cleared and cleaned, one of the glasses being marked at the back and fitted with a moveable index clip. At the beginning of a test the clip is fixed at the exact water level, so that any variation in the level may be noted. (3)

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* From paper read before S.A. I. of E.

HADFIELDS, Ltd.,

WORKMEN EMPLOYED: ABOUT 6,000

Hecla and East Hecla Works, Sheffield, England.

WORKS AREA: OVER 110 ACRES.

Sole Makers of HADFIELDS' PATENT

"Era" Manganese Steel,

THE SUPREME MATERIAL FOR THE

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After checking the coal scale and setting the correct weight of a suitable weighing box, convenient weights of coal are successively weighed out and shovelled into the boiler hoppers. As each weighed quantity is completely removed into the boiler hoppers, these being always kept "level full," the time is noted, indicating the amount of coal fed on to the grates since the previous time observation. I would here like to remiod you of the much greater simplicity and accuracy of the coal-weighing observations on a chain-grate stoker of the type used as compared with similar investigations when testing hand-fired boilers, with their fires of irregular thickness, due to the methods of firing and cleaning from the front. (4) The thickness of coal fed on to the grate is measured and observed by means of the usual indicator attached to the feed-bar. The latter should, however, be previously inspected, and measurements taken to check the indicators and ensure that the bars are lifting level across the grates. Any alteration in thickness during a test should be noted, and the times taken, but such observations are of less importance in an accurate efficiency test than in a fuel trial or evaporation test in which the coal is not weighed, but estimated from these observations. (5) The latter paragraph applies equally to the observation of grate speeds, which can, however, be noted by means of the position of the key spindle in the gear box. Having checked the travel of the grate at the lowest speed, the other speeds are simply multiples thereof. (6) A small proportion of each separate quantity of coal weighed is collected throughout the test. At the conclusion of the test the coal collected is weighed, and the weight deducted from the coal readings. The sample is then spread out on a clean surface, thoroughly mixed, and then quartered. Two diagonally opposite parts are rejected, and the other two again mixed and quartered, this process being repeated until a suitable quantity remains for analysis and grading if required. (7) At the conclusion of a test, or more frequently if necessary, the unburnt riddlings, which always fall through the chain grates, are weighed and allowed for, the grate pits being cleaned just before the start of such a test. (8) The floor beneath the ash hoppers is cleaned and the ash hoppers emptied on to it at frequent intervals through the test, the hot ashes being immediately quenched by means of a water supply conveniently arranged. These ashes are then weighed out in a suitable box on a scale, a fair sample being taken from each box. These samples are mixed and quartered as previously described until a suitable quantity remains for analysis. The analysis determines the percentage of moisture in the ashes, hence the correct weight of ashes due to the whole test is ascertained. (9) The boiler pressure gauges are checked and replaced if there is any appreciable error. An accurate pressure gauge has recently been fitted conveniently for observation from the test table to read the steam drum pressure, the water head on this gauge being measured, calculated in pounds per square inch, and allowed for. (10) The apparatus for observing the various temperatures is here for inspection. It consists of a Whipple temperature indicator and some typical platinum resistance pyrometers. Nine pyrometers are used to take the observations mentioned under paragraph (10), some of their positions being indicated on the boiler print. Each pyrometer is connected by means of four similar and continuous leads of exactly equal length to a terminal board, which in this case can take 12 pyrometers, and is suitably fixed over the test table. The indicator is connected to any pyrometer through the terminal board by means of the four-way flexible head and clip, and the nine temperature observations can easily be taken by the one observer in less than two minutes, the terminal board connections being arranged approximately in the order of the magnitude of the mean temperature measurements of the pyrometer connected. The pyrometers vary in construction for different temperature ranges, and for use in live steam, flue gases, water pockets, etc., but in principle their operation is the same. Each instrument has four terminals, two lettered "P" and two "C." The former are connected through suitably arranged leads to a fine platinum wire coil wound non-inductively on a former of some refractory substance such as mica, and situated at the extreme end of the pyrometer stem. The "C" terminals are connected through precisely similar leads to a small U-loop, which reaches just to the terminals of the platinum coil. Thus, at any temperature of the pyrometer stem the resistance across the "P" terminals exceeds that across the "C" terminals by the resistance of the platinum coil. Each pyrometer is correctly connected to correspondingly marked "P" and "C" terminals on the terminal board, all connections being made by well-fitting and sweated cable-ends or by solid soldered joints. The principle of the operation of the measuring instrument is the well-known one of the Wheatstone Bridge. It contains two resistance arms of unity ratio, the other two arms being the resistance across the "P" terminals, consisting of the platinum coil and leads; and the remaining one is the resistance of the leads corrected to the "C" terminals plus an adjustable resistance, which set to give a zero deflection of the galvanometer needle, is just compensating for, and is therefore a measure of, the resistance of the pyrometer platinum coil.

In marking off the scale on the drum on which the adjustable resistance is helically wound, it is assumed that the change in temperature is proportional to the change in resistance. Hence, if R_{100} is the resistance of the platinum coil at 100°C., and R_0 its resistance at 0°C., then

$\frac{1}{100}(R_{100} - R_0)$ is the change in resistance for 1°C.

Now, if Rt is the resistance of the coil at any other temperature t°C., then $Rt - R_0$ is the increase of resistance above 0°C., and the temperature represents $\frac{100\,(Rt - R_0)}{(R_{100} - R_0)}$ degrees.

These degrees are called degrees on the platinum temperature scale, and are denoted by "pt." The relation between this platinum scale pt and the air scale t was proved experimentally by Callendar and others to be represented as follows:—

$$d = t - pt = K\left[\left(\frac{t}{100}\right)^2 - \frac{t}{100}\right]$$

where K is a co-efficient dependent on the purity of the platinum wire, and has a value of 1.5 for the instruments used. The observations on the Whipple instrument used on these tests, however, require no correction, the divisions on the drum being so marked as to make allowance for t — pt, and so give true air scale temperature readings.

(To be continued.)

United Engineering Co. Liquidation.

The adjourned extraordinary general meeting of the United Engineering Company, Ltd., was held this week to deal with the question of liquidation. The Chairman, Mr. Arthur French, explained the liquidation proposals as follows: In dealing with this question I may say that the board seriously considered the matter soon after the outbreak of the existing war in Europe. One of the reasons which influenced us in continuing to carry on the business was the comparatively large number of employees in our service, both in the town office and also in the workshops and yard at New Doornfontein, and our desire to keep these people employed for as long a period as possible, especially in such critical times as then seemed to be impending. The board has now, however, decided to recommend to you that the company be placed in liquidation, and the assets disposed of as opportunity affords. Naturally we shall endeavour to realise the business to the best possible advantage, but whether this will eventually take the form of selling it as a going concern or disposing of the assets (including the workshops) gradually, it is a matter on which I can offer no opinion at the present moment—the question depends entirely upon the chances that may arise and the offers that may be received. In the meantime contracts at the yard have to be carried to completion, and these and the sale of the stocks on hand and on the water will necessitate carrying on the business on a scale that will enable us to retain the services of the office staff and workmen for some time to come. One reason why I am specially desirous of realising to the best advantage is that the company which I represent on the board, *i.e.*, the General Mining and Finance Corporation, Ltd., is not only a very large holder of ordinary shares, but also owns all the founders' shares of the company, and the conditions of issue of the latter class of shares are that they participate to a very large extent in any surplus which may accrue after providing for current liabilities and paying back the capital at par. In fact, from this point of view the corporation holds the predominant interest in the company. The resolution as to voluntary liquidation was agreed to unanimously, and Sir George Albu and Mr. Arthur French were appointed liquidators.

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CONTENTS.

PAGE
Notes and News ... 173
Topics of the Week:
The Election ... 175
War Credit and Finance ... 176
State Aid to Mining ... 176
The Johnnies Report ... 176
The "Small" Mines of the Transvaal ... 177
Geology of the Murchison Range ... 178
The Year with the Johannesburg Consolidated ... 180
Correspondence and Discussion: "The Eagle Rock Drill"; "South African Red Cross"; "Dormant Mines on the East Rand" ... 181
Income Tax: Report on the Year's Working ... 182
Stoping Methods and Drilling Problems on the Witwatersrand—V. ... 183
The Water Supply on the Rand—XI. ... 185
Goerz Group: Quarterly Report ... 186
Mine Safety, Sanitation, and Welfare Bulletin:
Mine Manager's Views on Safety in Mining—II.... 187
The Week in the Sharemarket ... 189
The Week in the Mining Material and Engineering Trades ... 190
Engineering Notes and News ... 192

Notes and News.

Antimony and Molybdenite.

Owing to the great advance in the price of antimony, we are told, every available deposit on the Pacific Coast is being worked or is on the verge of working. An antimony smelting company, says an American exchange, has resumed work in San Francisco, and expects to produce at least sufficient for the local demand. If the price of antimony keeps up it is likely that supplies of the oxide ores of Lower California will enter the market. The last prices in London, as brought by mail, range from £115 to £125 for antimony. The molybdenite market was quiet, and the quotation ranged from 115s. to 120s. per unit for material containing not less than 90 per cent. MoS_2.

* * * *

Enemy Trading and Mine Dividends.

Mr. Bonar Law, Colonial Secretary, last week informed Mr. B. E. Peto (Unionist, East Wiltshire), regarding alien enemy businesses in South Africa, that no public trustee had been appointed in the Union, but the general policy of the Union regarding enemy trading was similar to that of Great Britain. Mining dividends payable to enemy subjects were being paid into the custody of the Union Treasury pending the conclusion of peace. He had no doubt the Union Government was quite alive to the danger of indiscriminate payment to banks in neutral countries.

* * * *

The Year with the Knights Deep.

The report of Mr. C. D. Leslie, Superintending Engineer of the Knights Deep, for the year ended 31st July, 1915, shows that an additional 59,620 tons were milled as compared with the previous year. The declared recovery value was increased by 3·542d. per ton, working costs (including expenditure due to the war, as well as renewals and replacements of machinery and plant) by 1·570d. per ton, resulting in an increased working profit of £17,255 19s. 8d. During the year considerable attention was given to the renewal of shaft timbers, etc., so that the cost of shaft maintenance increased by the amount of £10,432 = 2·135d. per ton. It is expected that the cost under this heading will be substantially reduced during the ensuing year. The development footage was 8,607 feet, or 6,381 feet in excess of the footage for the previous year, and thereby working costs were increased by £16,735 14s. 11d. = 3·424d. per ton milled. Of the footage developed, 6,375 feet were sampled, indicating a reef width of 39·7 inches and a reef value of 6·68 dwts. The fully developed ore reserve at 31st July, 1915, is estimated at 2,627,000 mine tons, valued at 4·25 dwts., and the partially developed ore at some 174,000 mine tons, of an indicated value of 3·9 dwts. per ton.

* * * *

East Rand Mining Estates.

The report of the East Rand Mining Estates, Ltd., for the year ended June 30, 1915, states that the landed interests of the company remain as last reported, totalling 21,146 acres. The sub-division of the farm Vlakfontein into portions suitable for the settlement of white farmers has been completed, and each of the six blocks into which it has been divided has been let to a responsible tenant at a satisfactory rental. It is proposed to extend this policy of sub-division to the other properties of the company, with a view to gradually replacing the present native settlers by responsible white farmers who will take long leases and pay a cash rental instead of a share of the crops reaped. The farm rentals received during the year under review show a net revenue of £2,406, which compares favourably with the previous year, when the revenue from this source amounted to £1,341. No development work has been carried out by the company during the year under review. The encouraging developments in the Springs and Geduld mines, which adjoin the company's Grootvlei property, and on the neighbouring Modderfontein properties, have fully confirmed the views held by the directors that in the Grootvlei and Palmietkuil properties the company possesses an extensive goldbearing area of great value. The various boreholes put down on these two farms have definitely proved the reef to exist over the whole of the Grootvlei and the greater portion of Palmietkuil, whilst the development work since carried out on adjoining properties has more than justified the expectations formed as to the value of the reef in this neighbourhood. Under existing financial conditions it has been quite impossible to raise the necessary working capital to continue the development and equipment of these mining areas, but the directors feel convinced, in view of these satisfactory developments, that they will have little difficulty in obtaining the necessary funds required for the purpose when normal conditions are restored. The expenses during the past year amounted to £1,905, the revenue being £5,598, showing a surplus of £3,692. This credit balance has been applied in reduction of the amount standing to the debit of the profit and loss account, which has now been reduced to £1,306.

* * * *

Oceana Development.

The report of the Oceana Development Company, Ltd., for the two years ended 31st December, 1914, states that the delay in presenting the report was occasioned, as already intimated in the circular of 22nd December, 1914, by the war. After the meeting held on 12th December, 1913, steps were taken without delay to carry out the policy which was outlined at and sanctioned by that meeting, and a prospecting expedition was equipped and three engineer prospectors sent out, who reached their destination in July, 1914. The outbreak of the war necessitated the stopping of all operations and the recall of the expedition early in August. It was hoped that they would have returned, or, at any rate, the full details of the work accomplished would have reached this country, in time for the annual meeting to be held in December last, but up to the present, although reports have been received of the work accomplished, the board have not received the full accounts, which would have enabled them to prepare a balance sheet down to 30th June, 1915. The statement of accounts down to 31st December, 1914, had, however, been prepared and audited, and are now presented rather than delay the annual meeting longer. The acquisition of mining rights over the large area of 60,000 acres in the diamondiferous zone of the Kasai River, referred to in the report prepared by Mr. Harold Hill, one of the prospectors, on his return, must be regarded as a valuable asset to the company, and when the war is ended it is the confident hope of the board that the original plan of further prospecting and exploitation may be carried out. The profit and loss account shows a deficit for the two years of £1,170, making, with £5,919 loss on realisation of investments and £731 in respect of " loans irrecoverable and amounts written off," a total of £7,820. Deducting the credit balance of £766 brought forward and £467 profit on land sales, there remains a debit balance of £6,586 to be dealt with hereafter.

* * * *

Pyrite.

The possibility of pyrite mining as an industry in this country has had attention drawn to it at various times as a result of the demand for sulphur for the production of sulphuric acid, of which a considerable quantity is used in this country, mainly in the manufacture of explosives. We are not aware that any undertaking devoted solely to the production and sale of pyrite is existent in this country, except a small venture on the Black Reef, where it is said that a few people are engaged in concentrating the pyrite in tailings and selling it at a profitable figure to the Natal Ammonium Company. A little while ago a large number of claims were pegged out in the Low Country on an extensive series of pyrite-bearing quartzite, in which the sulphide was fairly abundant. An occurrence to the west of Pretoria has recently been taken in hand, also, in the vicinity of a farm where a small galena proposition has been worked with very satisfactory results for some months past. The pyrite here is said to occur in the massive form, the vein being of the interstratified kind which is commonly found in the Transvaal System. To show the importance of the pyrite industry in other parts of the world, it may be mentioned that the latest available statistics show that the output of pyrite in the principal producing countries for the year 1913 was 3,177,713 long tons, exclusive of the output for Japan, Australia, Serbia, Russia and Greece, for which countries the figures had not been ascertained. The return from these places was probably about 200,000 tons, roughly. The sulphur content, estimated at 45 per cent., of the 3,177,713 tons, was 1,429,971 tons. The marketed production of pyrite in the United States in 1914 was 336,662 long tons, valued at £256,670. In addition to this, large quantities of crude sulphur were also produced. The greatest sulphur producing country is, of course, Sicily, whence no less than 417,727 metric tons, or say 400,000 Imperial tons, including both crude and manufactured products, were shipped in 1913. The value at the port of shipment ranged from £4 to £5 per ton for the various qualities. Some 13,741 tons of Sicilian sulphur were exported to South Africa during the same year. A figure of about £2 per ton has been quoted to us recently as the price which local buyers are prepared to pay for clean pyrite at present. The possibilities of an industry are obviously well worth looking into.

* * * *

The Gold Supply.

" South Africa's principal industry, the gold mines, shows no signs of having been affected by the war as far as the output is concerned," writes the *Natal Witness*. White labour has not been restricted, and the difficulties of securing native labour appears to have greatly diminished. Apart from the hard things which the Labour Party has to say about South Africa's mining industry, its utility as an Imperial asset in times like the present cannot be denied. A constant stream of gold, supplied with unfailing regularity, is what Germany would have given her ears for in this war, as it would have greatly relieved certain economic difficulties from which she must suffer badly. South Africa is of the greatest assistance to the Mother Country in this respect, and the Government should take care not to hamper the industry where matters such as an adequate supply of native labour is concerned. Whatever criticism may be levelled against the industry in peace times, some of which are no doubt very true, we must leave such matters for proper adjustment after the war is over; but, in the meantime, the energies of the Government should be directed towards increasing the gold supply. In this connection a great deal might be done with the Far Eastern Rand, which as yet is practically undeveloped, and would offer a tremendous field. Labour is always obtainable if the Government or the mining houses were to organise a scheme and we are convinced that the Home financiers would welcome any increase in the gold supply."

* * * *

The Steadiness of the Stock Markets.

The Stock Markets are now taking everything that comes their way in great good humour, their serenity being hardly ruffled by war developments, or by the prospects of further increases of taxation. It is not usual, as a rule, to look a gift-horse in the mouth; but it is worth while at the present juncture to examine the causes of this insular steadiness of the markets, in order to obtain some guide as to their probable course in the future, writes a London exchange. One of the chief factors of this steady feeling is that the markets are so hedged round with restrictions that the sources of supply have considerably diminished. In most cases it is easy enough to sell at present quoted prices, but it is quite a different matter to attempt to buy at that level. For instance, there are numerous Colonial stocks whose quotations are quite misleading, these being saleable but not purchaseable at the prices mentioned. Under these circumstances, investors who wish to deal will insist upon their brokers obtaining the buying as well as selling prices, and act accordingly. The fact is that all outside sources of supply have been cut off by the Temporary Regulations, and the home buyer is entirely dependent upon local sources of supply, which dry up very quickly. Thus, Paris cannot dispose of its Consols; New York and Amsterdam cannot send any Americans to London; the Cape is debarred from delivering its Kaffirs; Petrograd must keep its Russian Mines; and the Middle East must retain their

Rubber shares. Upon the whole, however, this circumstance is a somewhat doubtful blessing. In many markets an increase in the supply of stock would be heartily welcomed, as there is a demand which cannot be satisfied under present conditions. The public demand must, therefore, tend to strengthen quotations, even though only small lots of stock, which under more normal conditions could be bought and sold without causing a ripple in the market, are now changing hands. Under the circumstances, it would relieve the position here, and, at the same time, prove a graceful act to our friends abroad, if ways and means could be found to relax the "physical possession" clause for the purpose of enabling Paris, Petrograd and other Allied centres to dispose of some of their holdings on the London market, without involving the risk of enemy dealings. Under present conditions, even Englishmen resident in the Overseas Dominions find it a matter of practical impossibility to realise their securities in London. It should certainly not be beyond the wit of the authorities to devise means for meeting such exceptional cases of hardship. At the same time, it is some satisfaction to know that enemy holders of leading Kaffir gold shares, for instance, are unable to realise their handsome profits, although they must be badly in want of their money, even more than are holders in British and Allied Dominions. The conclusion that must inevitably be reached, after a survey of the whole position, is that, while present conditions are chiefly artificial, they are fully warranted, apart from some possible relaxation in the "physical possession" clause, and, to a certain extent, in the present level of Minimum Quotations.

* * * *

A Standard Price for Tin.

The question of a standard price for tin is being debated in Cornwall. The Carn Brea property has had a good year, and at the recent annual meeting, the Chairman, Mr. Gilbert, said that that good fortune was almost entirely due to the by-products of the mine, such as wolfram and arsenic. Wolfram is in high demand in the making of munitions, and the supply and price are in the control of the Government. Mr. Gilbert wants to know why the Government cannot set a standard price for tin at a figure which would safeguard the Cornish mines. Anything that relieved the mines from the hazards of the tin market and ensured them a living would be strongly welcomed in the West of England. It is so important to maintain home production at the present time, and to keep industries in being, that people who have strong views about the futility of attempts to alter economic laws and stem the tides of supply and demand would rather abandon for the moment some of their punctilios than see the water in the Cornish mines. But the Government may be excused for pausing before attempting to regulate prices in the market for a commodity of which they do not need the monopoly for war purposes. Wolfram is on a different footing from tin in this respect. And if a standard price is to be set for tin, there are many other industries which will want special privileges also. The question is not a simple one, and Mr. Gilbert's scheme will have to be regarded from many points of view, including that of the general consumer.

* * * *

Springs Development.

The quarter's development, together with a summary of the work so far accomplished at the Springs Mines, shows:—For quarter: Total footage 3,792, footage on reef, 2,755, footage sampled 3,135, reef width 20·77 inches, assay value 12·80 dwts. Previously reported: Total footage 24,118, footage on reef 11,799, footage sampled 14,685, reef width 22·51 inches, assay value 17·73 dwts. Totals and averages: Total footage 27,910, footage on reef 14,554, footage sampled 17,820, reef width 22·21 inches, assay value 16·92 dwts. Of the footage sampled during the quarter, 38 per cent. was in payable areas and averaged 26·51 dwts. over 22·25 inches. A similar analysis of the total development to date shows 54 per cent. of payable footage, averaging 23·47 dwts. over 26·69 inches. Good progress is being made in connection with the reduction plant; the principal excavations have been completed and work on foundations is well in hand.

TOPICS OF THE WEEK.

THE ELECTIONS

As little more than half of the results of the elections are to hand as we go to press, it is too soon to attempt any final survey of the position. All the larger urban constituencies in the Union and the rural ones of the Transvaal and Natal have given whole-hearted approval of General Botha's policy and actions. The defeat of the Nationalists in the country districts of the Transvaal is as sweeping and complete as that of Labour in the urban centres. Only the thoroughness of the disaffection in the Free State and its sporadic triumphs in the Cape Colony have saved the forces of racialism and reaction from utter rout. As it is, at the time of writing it is impossible to say whether or no General Botha will be able to command a majority, irrespective of his Unionist supporters. The question is being widely debated at the moment, and we may leave it to be solved by the course of events in the next few days. Meanwhile, we may congratulate ourselves that the great good sense of the people of the Union has been vindicated by the triumphant return of General Botha's supporters, S.A.P. and Unionist, in overwhelming majority. Particularly welcome in that majority are the strengthened ranks of men trained in business and industry, whose presence in Parliament will make for stable, progressive Government, and an intelligent treatment of industrial and commercial affairs. We need not single out names, but a glance at the lists of the supporters of General Botha—drawn from both S.A.P. and Unionist parties—will illustrate our meaning. The new Union Government, whatever else it may be, can be trusted to honour its obligations to the Empire in this time of trial and bring to the internal problems of administration increased ability and experience. What the result means to the credit and development of the country cannot yet be gauged in its entirety. Plainly, the rejection of even the very suspicion of anarchical doctrines of international socialism should have a material effect on that very real but untangible thing known as "confidence in the country," and the only just less sweeping blow administered to disloyalty and reaction in the country districts should contribute substantially in the same direction. The country has, indeed, been delivered from a menace and a nightmare. General Botha has got the vote of renewed confidence he asked for, and deserved so well. His much hindered, restricted, and delayed work of progress may now again be taken up, and pressed on with for the greater advancement of South Africa.

WAR CREDIT AND FINANCE

A valuable report on "The Effects of War on Credit, Currency and Finance" was presented and discussed at the proceedings of the Economic Science and Statistics Section of the British Association. For the purpose of its investigation the "Conference" divided the whole enquiry into four heads, namely: (1) The direct effects of the war on credit; (2) public borrowing as affecting credit; (3) war measures and currency; (4) war and the mechanism of foreign exchanges. The members of the "Conference" felt strongly that the time was not ripe for the presentation of a final report. The present was only an interim report and, necessarily, incomplete, but it had the advantage of attempting to present a picture of momentous events drawn whilst most of them were fresh in the minds of those who had special opportunities for observation. It aimed at focusing a body of reasoned opinion upon the causes and proximate effects of credit movements during the first year of the war. "However much present judgments may be shown by subsequent events to have been in error, in the opinion of the Conference it was essential that they should be recorded." With the report in detail we need not deal here, but it is so useful a document, and on a subject which concerns us all, that we may indicate the nature of its contents. The more important emergency measures made during the year 1914 are summarised, as are also the direct effects of the war upon credit. The next section has subsections dealing with the following matters: (a) Effect of assistance by the Government to banks and financial houses in August, 1914; (b) was their hoarding owing to the war?; (c) emergency measures to meet the need for currency; (d) the extent to which these measures were effective, necessary, or desirable; (e) effect of increased paper currency on prices. The reference to public borrowing for the war as affecting credit is divided up this: (1) General effects of public borrowing on credit; (2) effect of the regulations as to the issue of new capital; (3) extent to which capital is withdrawn from enterprise; (4) effect of borrowing in Great Britain by Allied Governments. War taxation, and the war and the foreign exchanges, are the remaining sections, and an appendix discusses the "Third War Loan." The report in its concluding sentences says that economy should be enforced as well as preached, and "the lesson should be the easier in that Germany has already set an example to the whole world. But when all these palliatives and remedies have been adopted there is little doubt that there will remain a great deal to be done, and our weapon for this purpose must be the raising of credits abroad." "No one doubts that the British Government could raise money in the United States on favourable terms." In the discussion that followed, Dr. Yves Guyot said that on the morrow of the war an enormous mass of fixed capital would have to be reconstituted, railways, houses, and working plant to be reconstructed. The needs would be great, the purchasing power small, and the cost would be increased by the high rate of interest, the difficulties of procuring working plant and instruments, the scarcity of labour, and fiscal surcharges. The only means of repairing losses and increasing the economic power of a nation was to intensify production. The application of these points to South Africa is immediate and obvious.

THE JOHNNIES REPORT.

Notwithstanding that the war broke out only a few weeks after the drawing up of the previous accounts the directors of the Johannesburg Consolidated Investment Company, Limited, are in the happy position of being able to report almost as large a profit for the year ended June 30th as for 1913-14. Some extracts from the report appear elsewhere in this issue. After making full provision for depreciation the outcome of the past year's operations is a profit of practically £190,000, as compared with £199,600 for the previous twelve months. After payment of the annual dividend of 1s. per share, there will be £163,000 to be carried forward, against £170,500 brought in. Where necessary, moreover, all the company's holdings have been written down to the prevailing market price, although their aggregate market value largely exceeds the amount of £2,919,000 (against £3,221,800 at end-June, 1914) at which they stand in the balance-sheet. Nearly £466,000 of the company's reserves is more or less locked up for the present in "pre-war loans against securities, subject to the Treasury and Stock Exchange regulations," and there are on the other side sundry creditors to the tune of £514,000. But the liquid cash assets total £833,000. Moreover, the company has substantial holdings in the British and South African Government War Loans. No one can seriously quarrel with the directors' claim that having regard to the adverse financial conditions prevailing during the period under review the financial results must be considered "highly satisfactory." While the Johnnies Company, like the other big finance houses, has not been able for some time past to make any substantial profits from share dealings and financial operations such as accrued in good times, the strength of its position lies in the uninterrupted progress of its principal subsidiaries. Both the Consolidated Langlaagte and the Van Ryn Deep have been able to declare increased dividends during the past year and the Witwatersrand (Knights) has continued to make excellent profits, enabling it easily to maintain its distributions. Furthermore, the prosperous future of the Government Gold Mining Areas, which commenced crushing last October, is now considered to be assured. Here are presented the salient features of the past three years results:—

	1915. June 30.	1914. June 30.	1913. June 30.
Stocks and shares ..	£2,919,110	£3,221,784	£3,436,465
Properties and advances	58,349	83,424	64,884
Estate and buildings...	643,098	650,888	661,888
Mortgages	148,948	168,594	104,073
Loans, cash and debtors	833,179	932,365	1,009,902
Less creditors	711,802	672,135	915,333
Surplus	121,377	260,230	94,569

The surplus shows a considerable reduction; but satisfactory progress is being made by the companies included in the group, and their aggregate value of their gold production has increased during the twelve months by no less than £603,760, to £3,622,207.

STATE AID TO MINING.

In the matter of State aid to mining, South Africa can learn something from Australia. Recognising the great public value of mineral discoveries, and knowing that it was the discovery of gold in large quantities which attracted population to Australia and laid the foundation of its nationhood, the State Governments are prepared to assist in various ways all attempts made to discover and open up new mineral areas. In New South Wales up to the end of 1913 the total sum distributed for the purpose of assisting prospectors amounted to £443,661. During one year £10,302 was advanced and £15,169 was paid by the Government of that State as subsidy to the Miners' Accident Relief Fund. In Victoria, under the Mining Development and Surplus Revenue Acts, £417,257 was expended from revenue and £200,000 was provided out of votes during the period 1897 to 1913. In Queensland State assistance to mining during 1913 amounted to £21,098. This was spent in deep sinking, grants in aid of prospecting, construction of roads and bridges to mineral fields, and advances under the Mining Machinery Advances Act. In South Australia aid is given to the mining industry under the terms of the Mining Act of 1898. Up to 1913 £58,208 had been distributed, a portion of which had been repaid to the Government. The Government also has a number of batteries at work in the State. In Western Australia advances are made by the Government in aid of mining work and equipment of mines, erection of crushing plants, in aid of boring and providing transport. Over £1,200 was expended in one year on water supply, roads, cartage and subsidies for development below the 100 feet level in small mines. In this State there have been 40 State-owned batteries or reduction plants in operation, the total cost of these being £332,378. Last year the receipts amounted to £47,987 and the working expenditure £55,362. These State-controlled plants have recovered gold and tin to the value of £4,189,955, resulting from the treatment of 960,989 tons of gold ore and 64,920 tons of tin ore. In Tasmania State aid is also given under the Aids to Mining Act, and in one year £9,847 was expended in prospecting and development work. In the Northern Territory prior to 1912 prospectors were helped by grants of rations and some monetary assistance, but it was found that these privileges were occasionally abused, and now provision is made for generous grants to discoverers of metalliferous ores. Aids granted to prospectors in 1913 amounted to £2,373, of which £633 was paid in respect of gold, £1,865 for copper, and £55 for other minerals. There are immense areas in Australia which have not yet been properly tested for mineral values, and genuine parties prepared to take up this work may, as is shown in the foregoing, expect encouragement from the State or Commonwealth authorities.

THE "SMALL MINES" OF THE TRANSVAAL.

Progress of "Outside" Propositions—Barberton and Pietersburg Activity.

In our last issue a list of various small ventures in the Pilgrim's Rest district was given from which it was apparent that an amount of no less than £48,917 was obtained from operations at small mines. The returns of the Transvaal Gold Mining Estates were dealt with separately, by reason of the fact that the company is treating ore mainly at one comparatively large central mill, with a capacity of 60 stamps. Even here, however, the output is derived from separate small mines at several points, each of which may be assumed to be paying its way individually. Taking all the circumstances into consideration, therefore, it may be said that the Pilgrim's Rest district is obviously a favourable area for small mining, and any one who knows the country thereabouts can vouch for the fact that this kind of mining is capable of indefinite expansion in the district. In other parts of the Transvaal, also, small ventures appear to possess opportunities, for instance, in the Barberton district, as will be seen from the following list of undertakings which are declaring gold:—

Name of Mine or Concern.	Farm.	Stamps Erected.
Agnes G.M.	Ameide	2 (Nissen).
Alpine Synd.	Ameide	8
Aurora Mine	Government Ground	10
Barrett G.M. Co., Ltd. ..	Berlyn	Whitaker Mill.
Consort Mine..	Government Ground	20
Fairview (T.C.L.), Ltd. ..	Government Ground	2 (Nissen) and 1 Tube Mill.
Imperial G.M. Synd., Ltd.	Government Ground	10
Maid of the Mist	Government Ground	10
New Fortuna G.M.	Brommers	30
Pioneer G.M.	Oorschot	5
Sheba G.M. Co., Ltd. ..	Government Ground	120
Worcester Explor. & G.M. Co., Ltd.	Government Ground	40 and 2 Tube Mills.
Victory Hill G.M. Synd. ..	Government Ground	5
Reliance Synd.	Ameide	3
So Far Synd.	Steynsburg ..	1
New Shebang Mine ..	Ameide	6
Florence Mine (C. T. Haddock)	Coetzeestroom ..	5
Barbrook Synd.	Government Ground	5

The quantity of gold obtained from the Barberton district during the month of August last was £27,570, of which 11 concerns, with a total capacity of 192 stamps and 3 tube mills, and one other of which the capacity is not recorded, gave a return of £27,475. A little more than half of this amount may be deducted for the yield from the Sheba and Worcester mines, leaving a fair share for the remaining small ventures.

PIETERSBURG SMALL VENTURES.

From the Pietersburg district only £160 worth of gold was registered for the month of August in the published returns of the Mines Department. Of this amount £129 was produced from two mines, with a total capacity of 15 stamps. The remainder was yielded by reef digging and tailings, the much-vaunted alluvial ground of the district being quite unrepresented. The list given below shows that enterprise in the direction of small ventures is not greatly in evidence in this vast area of the Zoutpansberg.

Name of Mine or Concern.	Farm.	Stamps erected
Transvaal Exploring Lands and Minerals	Eersteling	5
Pala Pala G.M. (Hope's Tribute)	Government Ground Klein Letaba	15
Haenertsburg Gold & Copper	Government Ground Haenertsburg	10
Letaba Tributing Co. ..	Government Ground Klein Letaba	5
Jones & Erskine Synd. ..	Langgenoeg ..	5
Crag's Mine (E. G. Reed) ..	Crags	3

PERSONAL.

Mr. R. A. Barry, General Manager of the Transvaal Gold Mining Estates, revisited the Rand for a few days this week.

* * * *

Mr. J. W. Kirkland, M.Am.I.E.E., P.O. Box 1905, Johannesburg, has been appointed Local Honorary Secretary for South Africa of the American Institute of Electrical Engineers.

* * * *

Major U. P. Swinburne, Chief Inspector of Mines in Johannesburg, was seriously wounded while leading his battalion of the Seaforth Highlanders at Loos on September 25, and is now in hospital at Dublin.

Kamfersdam Diamonds.

The 20th ordinary general meeting of the Kamfersdam Mines, Ltd., was held in mail week. The Chairman said: Gentlemen,—The report of the directors and the accounts for the year ended the 30th June, 1915, have been in your hands for several days, and I suppose it will meet with your approval that they be taken as read. Dealing first with the accounts, I fear that there is not much that I can add to the full statement that has been submitted to you. By comparison with former years the items of working expenses are necessarily very much smaller, as the mine and machinery have been worked for about a month only during the year under review: but the standing charges of interest, maintenance, etc., have remained, while there has been practically no production of diamonds. This condition of things has resulted in a further debit of £7,934 10s. being carried to the balance-sheet, making our total debit to the 30th June, 1915, £172,897. Turning to the balance-sheet, the issued capital is the same as last year, £357,033. The Debenture issue, fully paid up, is £40,000, and the bank overdraft has been increased from £6,301 to £15,101. This overdraft is guaranteed by Messrs. Krauss Brothers to the company's bankers in Kimberley, and it is principally in connection with this guaranteed liability of the company that we propose to create a series of Second Debentures, as set out in the directors' report. The Debentures will also be a collateral security to Messrs. Krauss Brothers for the interest on Debentures and sundry further cash advances made and to be made by them for the current expenses of the company. The item of sundry creditors represents the cash advances already made by Messrs. Krauss Brothers, directors' fees accrued but not paid, and sundry small items, since liquidated. On the credit side of the accounts, property, buildings and machinery and plant are practically the same as last year. Blue ground on floors is slightly increased and represents the bare cost of mining and depositing, no estimate of the cost of the diamond contents having been added. As you will have read in the report a regrettable fall of reef into the mine has taken place since the working was stopped, but until a survey has been made we are unable to state to what extent this fall will affect the mine and workings. It is, however, strongly borne in upon the minds of your directors that the time has most probably arrived when it will prove to be expedient to adopt an underground system of working, by means of shafts sunk well beyond the present edge of the open workings. We have already ascertained by means of prospecting passes that below the present working level the blue ground carries at least as good if not a better, yield than the ground already worked.

Australian miners are digging for gold in the trenches on Gallipoli Peninsula, says a dispatch to the Chicago *News*. They were surprised at the similarity of the Gallipoli ground to the Australian gold fields, and their sharp eyes soon discovered traces of the yellow metal. In their spare time the miners built rude placer outfits on the seashore and began washing for gold. They found it, and now the Australian troops with mining experience are passing every minute when not fighting the Turks in washing clay, which is brought to the shore from half a mile inland.

GEOLOGY OF THE MURCHISON RANGE.

The Schistose Auriferous Zones—Some Interesting Problems Awaiting Solution—The Question of Correlation.

The geology of the Murchison Range is treated of at some length by Dr. E. T. Mellor in the annual report of the Geological Survey of the Transvaal for 1906, and by Mr. A. L. Hall in a memoir published by the Survey in the year 1912. Although both these publications go extensively into questions regarding the character of the sedimentary and igneous rocks and their mutual relationships, they are only able to do so somewhat broadly, by reason of the complicated structure and arrangement of the various groups of metamorphosed sedimentary and igneous rocks of which the area is composed. It may be summarily concluded, as Mr. Hall remarks, " that as regards petrographical characters the rocks of the Murchison Range, with the associated schist belts to the south and those found near Haenertsburg, comprise a large and varied series, in the great majority of cases more or less schistose. Obviously much detailed investigation has to be done before the numerous rocks can be satisfactorily determined and their mutual relationships fully understood. One important result, however, may be regarded as established, namely, that both sedimentary and igneous rocks are represented." The schistose group of rocks represents the older formation in the district and was intruded by granite which is classed in the wide category of " older granite " in contradistinction to that of the Bushveld. A large mass of younger granite, syenite, and pyroxenite, which goes by the name ot the Palabora Plutonic Complex, has been intruded into the older rocks just mentioned, and has doubtless had considerable dynamic and mineralogical influences upon them, which have so far been only partially investigated. The age of this later intrusion has not been determined, although it is considered by the Survey to represent a phase of activity during a period intermediate between the Bushveld epoch and that of the older granite of the Murchison. The relative distribution of the various groups referred to is shown in the accompanying geological sketch map. The schistose group comprises a variable assemblage of rocks ranging from thoroughly quartzose to highly basic varieties. The commonest types are talc schists, chloritic mica schists, and hornblende schists. The occurrence of sheared conglomerates is also pointed out by Mr. Hall as a circumstance of some interest, as is also the presence of banded ferruginous quartzites (banded ironstones so-called), limestones and various phyllites—the latter impregnated with rosettes of metamorphic tourmaline. It must be observed that all the above varieties, whether of sedimentary or igneous origin, are highly sheared, and show in a marked degree the effects of mechanical deformation.

The Auriferous Belt.

Two well-marked belts of zones of auriferous reefs are known along the Murchison Range east of Leydsdorp, in which direction the formation appears to have more regular and unbroken features. These belts run roughly parallel with each other, at a distance of three or four miles apart, and have been traced for between 30 and 40 miles. The gold-bearing deposits are uncertain in character, occurring for the most part in ill-defined lenticular bodies, or still more indefinite mineralised zones having none of the distinctive features of a true vein, with regular hanging and foot walls. These facts do not seem to have been thoroughly understood by prospectors and other interested persons, who have not fully appreciated the point that in the Murchison we are dealing with mineralised zones, rather than with distinct and continuous lines of reef. The ore bodies, as classified by Dr. Mellor, comprise:—

1. *Lenticular Reefs*, usually composed of coarsely crystalline quartz, or quartz with calcite, dolomite, and other carbonates showing no schistose structure, and more or less sharply distinct from the country schists, whose planes they occasionally cross. As exemplifying this class may be mentioned the main and south reefs of the Free State mine.

2. *Mineralised Zones in the Schists*, consisting of numerous lenses and thin sheets of crystalline quartz usually associated with calcite, dolomite and iron carbonate, intimately connected and interleaved with the schists, following their planes of schistosity and merging into them on their margins. Although not so clearly differentiated as No. 1, they are more constant in width and more continuous over long distances. This class attracted the chief attention in the early days of the field, and as a prominent example may be quoted the " Pyritic Reef " of the Free State mine.

3. *Black Reefs*, or banded ferruginous quartz-schists (banded ironstones), schistose quartz rocks with numerous bands of ferruginous material, sometimes almost entirely composed of iron oxides. A typical example is exposed on the Mashambane Hills, west of Leydsdorp, where a considerable amount of work has been done upon the auriferous bodies. All these classes of reef are found both upon the northern and southern belts of the Murchison Range. On the northern line, however, a special characteristic of the first and second classes is the occurrence of antimony associated with the gold, sometimes in large masses, more usually, however, in class 2. This circumstance has given rise to the name of the Antimony Line which is applied to the northern auriferous zone which contains the Gravelotte, United Jack, Weigel, and other mines. The southern zone, less developed and prospected, and without antimony, contains the Blue Jacket and La France mines. West of Leydsdorp the structure of the two zones, which are fairly well-defined on the east by a succession of hills, particularly along the Antimony Line, becomes somewhat more irregular and complicated. The southern group of quartzites which constitute the Tafelkop, Blue Jacket and La France ridge, are apparently tending abruptly to the south-east from Tafelkop, bending finally towards the Sutherland Reef mine, which is thus stratigraphically connected with the La France horizon. Further still, towards the west where prominent reefs of the No. 1 class, as well as banded ironstones, are found on Sedan, not far from the road, the near presence of the northern range has led to the belief that the reefs belong to the group which comprise the Antimony Line. Here, however, the existence of the well-known Mamba Bar throws valuable light upon the position. The Mamba Bar, a siliceous, calcareous or dolomitic schist of peculiar and unmistakeable appearance, is well represented along the summit of Mashambane on Coblentz. It has been noted running across the eastern boundary of Potsdam, not far from the locality where Mr. Eklund, of Pietersburg, is opening up a scheelite occurrence, which, by the way, is said to have been well thought of by the Mines Department. Although not observed by the Geological Survey, there is an exposure of the Mamba Bar over some distance on Sedan, with the associated banded ironstones, as found upon Mashambane. The quartz reefs above referred to lie to the south of the Mamba Bar, and seem to represent a special development of quartz along an horizon which, on Mashambane itself, is more schistose and highly pyritic.

The Sedan Problem.

According to Hall, the Mamba Bar, with its associated banded ironstone, is to be found south of Spitzkop, close to the main shaft of the old Blue Jacket mine. The Coblenz and Sedan occurrences are thus to be correlated with the Southern or La France group of schists, rather than with the Northern or Antimony Line group. On the other hand, experienced prospectors appear to hold the reverse opinion, and they are supported in this view by the relative position of the range immediately adjacent to the north, which is clearly an extension of the Gravelotte-Free State range, and by sundry other phenomena which are considered to be of value as indications by those who have worked in the district. Quite apart, however, from the question whether the sheared quartzites and schists of the Antimony Line can actually be traced right on to Sedan, there is to be considered the question how far the mineralised zones of the Murchison Range are related to certain defined schistose horizons. There seems to be no evidence available regarding this point. In other words, although the ore bearing solutions which have formed the various deposits of the Range have undoubtedly preferred to follow the planes of schistosity in a general way, it has not been shown that they do so invariably. Hall has pointed out that there are indications which suggest that the Murchison Range was affected by movements which took place some time after the rocks had acquired their schistose character, and he refers these movements to the period when the rocks of the Transvaal System were intruded by the Bushveld Plutonic Complex. The horizontal direction of these movements was approximately that of the direction of schistosity in the rocks of the Murchison Range. Since the various schist horizons north and west of Leydsdorp do not follow the same course as those which lie eastwards, it is not improbable that in the vicinity of the dorp the main line or zone of mineralisation may continue directly into the Potsdam granite and thus diverge to the south-west, away from the northern range of hills. In this event the Antimony Line would not necessarily be continuous to the west of Leydsdorp. Assuming, on the other hand, an equally probable condition, namely, that mineralisation has been much more widespread than would be the fact on the last supposition, that certain schistose horizons were more favoured than others, and that, therefore, the Antimony Line of auriferous occurrences were continuous in proximity to certain ironstones and limestones, and sheared quartzites which are well represented along the Gravelotte-Free State section, the problem to be faced is one of correlation. In view of the fact that the intrusion of the old granite, together with later movements, have tended to add additional confusion to an already complicated group of igneous and sedimentary schists to the west of Tafelkop, there is obviously some difficulty to be expected in setting about a process of this kind. The banded ironstones, for instance, which might be of some use in the work, are not confined to one horizon; there are at least two different bands, and are probably three. The limestones are scanty and very poorly developed, except in patches. There is, however, a zone of sedimentary rocks which is likely to be extremely useful for purposes of correlation, if it is sufficiently continuous along the Murchison. Its presence in the Low Country was recorded by Hall for the first time, as far as we are aware, in his report upon the geology of the district, where the sheared conglomerate near the Gravelotte mine and in several other localities was described at some length. There does not appear to be more than one of these bands in the Murchison section, and its undoubted sedimentary origin and distinct characteristics should render it the most reliable indicator of the Antimony Line. There is little reason to doubt its persistency along the Range, for sheared conglomerates are well represented in the Mont Maré section, south of Pietersburg, which has been satisfactorily correlated with the Leydsdorp sedimentaries. It is possible, however, that the more intense compression suggested by the granite of Potsdam and Sedan may have tended to eliminate the outcrops of this bed in that neighbourhood. They are certainly well worth looking for, nevertheless.

Relative Age of Reefs.

A question of some interest, in view of the presence of antimony in the northern zone of reefs, and its absence in the La France line, is the relative age of the various auriferous occurrences. It is a matter that has not been dealt with by the Geological Survey, inasmuch as it is one that would require a considerable amount of special information. The effect of shearing is well shown in the "paint gold" which appears on slickenside surfaces in the Sutherland mine. We do not remember to have heard whether similar phenomena have been observed in the antimony group of reefs. The evidence of shearing, which is attributed to movements that were probably associated with the Bushveld Plutonic intrusion, would clearly have some bearing upon the question of the relative age of the reefs. The association of the older and younger granite with the mineral occurrences is an allied problem that would be deserving of investigation. So far the influence of the later intrusion, as shown in the mica bearing pegmatites south of Leydsdorp, has only been partially studied; the economic influence of the older eruption have yet to be enquired into.

The Union Finances.

The most satisfacory feature of the Union Exchequer account for the month and five months ending August 31 is the excellent yield from Customs and Excise duties, which have brought in £2,104,443 since the beginning of the financial year, or some £30,000 in excess of the estimates. The yield during July and August was exceptionally heavy, amounting to £486,000 and £478,000 respectively, as against £414,000, which is the monthly average required to bring the total up to expectations. The gross figures show a total income of £3,350,153 for the five months. This is £200,000 in excess of the receipts during the corresponding period of last year, but necessarily falls very considerably below the five months' proportion of the total estimated receipts for the year, the explanation being that as yet some of the principal sources of revenue, such as the income tax and the gold profits tax, have not begun to contribute to the Exchequer receipts. On the whole the revenue returns give promise of showing a considerable surplus in excess of the estimates, but forecasts under present conditions are obviously dangerous. All that can be said is that if the five months' returns are maintained, the estimated revenue for the year should be exceeded by well over a million sterling. On the expenditure side of the account there is continued evidence of economy, except, of course, in so far as the Defence Department is concerned. The loan account shows expenditure incurred since the financial year began to the amount of £8,300,000, of which £7,107,000 is war expenditure. The total direct cost of the War and Rebellion up to date has been £15,857,000.

* * * *

Sir J. L. Hulett & Sons.

The report of Sir J. L. Hulett & Sons, Ltd., for the twelve months ended 30th June, 1915, states that the tea sales for the year amounted to £55,629, the increase being due in a considerable measure to the realisation of the large stocks of tea on hand referred to in last year's report. Sugar sales, including treacle, reached the amount of £572,399, being an increase of £61,636. At the same time it must be noted that there was an extra amount of £44,530 expended upon cane and that the costs of all materials used in the manufacture of sugar have increased very considerably. The amount of sugar manufactured at the mills for the last season was 38,770 tons, as against 32,575 tons for the previous season. After making allowance for depreciation and for all the usual charges and expenses the profit on the twelve months' working is £58,888. From this amount, however, there has to be set aside a sum as provision for Union income tax, and in view of the increased rate of taxation budgeted for under Act No. 23, 1915, it has been considered necessary to set aside an amount of £12,500 from appropriation account, thus leaving a net disposable balance of £46,388. The directors have decided to declare a dividend of 8 per cent. for the year, absorbing £40,000. There has been written off profit and loss account the old balance of the cost of issuing new shares and debentures—namely, £12,265—which has hitherto appeared among the assets.

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THE YEAR WITH THE JOHANNESBURG CONSOLIDATED.

Financial Strength Maintained—Excellent Progress of Subsidiaries.

The report of the directors of the Johannesburg Consolidated Investment Company, Ltd., to be submitted to the shareholders at a meeting to be held in the board room, Consolidated Building, Fox Street, Johannesburg, on Tuesday, the 9th day of November, 1915, at 11.30 a.m., shows that, after making full provision for depreciation, the outcome of the year's operations is a profit of £189,992 5s. 8d., which, with the balance brought forward from last year, viz., £170,525 8s. 6d., makes an aggregate available balance of £360,517 14s. 2d. Having regard to the adverse financial conditions prevailing during the period under review, this result must be considered highly satisfactory. On the 21st June the directors declared a dividend of 5 per cent. for the company's financial year ended 30th June last, which is payable to shareholders registered at that date. Warrants will be posted to shareholders on the 28th September. This distribution absorbs £197,500, the balance, viz., £163,017 14s. 2d., being carried forward to next account. Where necessary, all the company's holdings have been written down to the prevailing market prices, although their aggregate market value largely exceeds the amount at which they stand in the balance sheet. The company continues to hold a large proportion of liquid assets, and the financial strength of its position is fully maintained. Substantial subscriptions have been made to the War Loans issued by the British and Union of South Africa Governments. As regards the principal gold mines under the company's control, the directors are pleased to record uninterrupted progress. Satisfactory arrangements, rendered necessary by the war, are in operation for the disposal of the company's gold, and in respect hereto every assistance has been rendered by the Imperial Government, the Union Government of South Africa, the Bank of England, and the South African banks. The Consolidated Langlaagte Mines, Ltd., is fully justifying the favourable expectations which have been entertained regarding it, and has been able to reduce its debenture debt considerably beyond the ordinary redemption requirements and at the same time increase the half-yearly dividend from 10 per cent. to 12½ per cent. The results from the Van Ryn Deep continue most satisfactory, and there seems every reason for thinking that this property will prove to be one of the most successful mines on the Rand. The company paid a dividend of 15 per cent. for the first half of this year, as against 12½ per cent. for the previous six months. The Witwatersrand Gold Mining Company (Knights) continues to make excellent profits and to maintain its dividend at the rate of 50 per cent. per annum. The Government Gold Mining Areas (Modderfontein) commenced crushing last October, and its monthly profits are steadily increasing. Financial arrangements have been made for the purpose of enlarging the company's reduction plant, which, when completed, will more than double the results so far obtained. The prosperous future of the company is assured. It is satisfactory to record that the aggregate value of the gold produced by the company's group of mines for the year ended 30th June last amounted to £3,622,207, being £603,760 in excess of that for the preceding twelve months. The aggregate amount of dividends distributed for the same period was £999,460, being an increase of £22,268 as compared with the year ended 30th June, 1914. The revenue derived from the estates and town properties has been adversely affected by the conditions prevailing in Johannesburg, a large proportion of the male population having been engaged in the campaign which has now been brought to so successful a conclusion in South-West Africa. The directors regret that, owing to domestic reasons, the company's consulting engineer, Professor Lawn, has been obliged to take up his residence in England. The directors desire to record their high appreciation of Professor Lawn's services, and are pleased to state that he has been appointed consulting engineer to the company in London, and will pay periodical visits to South Africa in the company's interests. Mr. W. L. White (who has been in the company's service for many years as assistant to Professor Lawn) has been appointed consulting engineer in Johannesburg.

The Month's Trade.

In moving the adoption of the report of the Executive Committee at the monthly meeting last week of the Johannesburg Chamber of Commerce, the President (Mr. E. Chappel) said that the railway revenue returns were under present circumstances most gratifying. The figures in the report were for the eight months of the calendar year. Taking the official financial year they found for the five months from April to August an increase over last year of £11,087. In view of lessened inportations the revenue from goods traffic was naturally less (by £99,025), and it had to be remembered that a portion of the revenue—particularly under the heading of passengers and live stock—represented charges against the Defence Department in connection with the movements of the forces. July showed a distinct advance over previous months in regard to the tonnage of oversea traffic brought to the competitive area (the Rand and Pretoria). The figure was the highest recorded since August of last year, and was, approximately, equal to July, 1914, the comparative figures being: July, 1915, 32,627 tons; and July, 1914, 33,074 tons. The Committee had addressed the Railway Board urging the continuance of the principle embodied in Clause 17 of the Union Tender Board Regulations. This carried out the previous recommendations of the Chamber that in order to be fair to South African merchants tenders from South African firms and from oversea, respectively, should be compared with due regard to the payments which in the ordinary course were due in respect of charges such as Customs duty, freight and railage.

An Industrial Exhibition.

Arrangements have been made for the opening of a South African Industrial Exhibition at Durban in March, 1916, which will remain as a standing feature at the Hall by the Sea until August, 1916. The organisers of this undertaking realise (says the *Natal Advertiser*) that an opportunity presents itself to business men of obtaining a good footing in the South African markets, and of capturing trade which has hitherto been entirely in the hands of Germans.

Knight Central Still Improving.

The following has been officially communicated to the Press by the secretary of the Knight Central, Ltd.: "17th level crosscut, west shaft, south of dyke, upper portion of South Reef intersected, assays of four samples average 12·5 dwts. over 60 inches."

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Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

The Eagle Rock Drill.

To the Editor, *South African Mining Journal.*

Sir,—There appears in your issue of the 16th inst, page 156, an article entitled "Rock Drills in Use on the Rand," by E. M. Weston, A.S.M.B. In the course of this article, the following sentence appears:—"The tappets and valve on the Eagle drill are subjected to very severe wear and require frequent attention." This is a general statement, but the expression "very severe wear" is one to which exception must be taken. By tappets and valves, it is presumed that Mr. Weston means the rocker arm and valve, and the following figures, giving the percentage of valve parts furnished by us per month, compared with the number of machines actually being used as nearly as we can ascertain, and the average life of these parts may be of interest. For machines in actual commission, we have supplied over the last eight months the following average per month:—Valves, 6 per cent.; seatings, 7 per cent.; rocker arms (tappets), 12·8 per cent. Of these, it will be seen that the average life of the valves is 16·4 months, of the valve seatings 14·2 months, and of the tappets 7·8 months. These figures speak for themselves, and we shall be glad if you will give publicity to this definite data.—Yours, etc.,

STURROCK & CO.,
Agents for Eagle Rock Drills.

Johannesburg,
October 18th, 1915.

South African Red Cross.

LETTER FROM LADY BUXTON.

To the Editor, *South African Mining Journal.*

Sir,—The British Red Cross and Order of St. John have appealed through Lord Lansdowne for funds to be raised throughout the Empire on Thursday, October 21st (Alexandra Day), and in consequence of this appeal collections are being organised by the Red Cross South Africa (which federates during the war the Central Good Hope Red Cross Committee and the South African Red Cross Society—both of which are affiliated with the British Red Cross Society) in the Union on the day named. The Committee are of opinion that the public here would desire that any sums collected should be applied for the specific purposes in which they are interested. The sums raised by the collection, therefore, in the first instance, will be ear-marked for the following purposes:—(1) To supplement the equipment of the S.A. General Hospital and of the field ambulances which are accompanying the contingent; (2) to meet the requirements of the local military hospitals; (3) to continue the supply of fruit to the British Red Cross; (4) to meet the needs of the sick and wounded in connection with the operations in East Africa. Any balance not required for these purposes would be handed over to the British Red Cross Society. It may be pointed out that these undertakings of the Red Cross South Africa are in themselves an indirect contribution to the funds of the British Red Cross Society. I am anxious to commend this appeal to the notice of the South African public. Although I know how many calls there have already been made upon their well-known generosity, I feel convinced that the objects of the Red Cross will have their warm sympathy, and that I shall not appeal in vain. I hope that every district throughout the Union and the Protectorates will join in making the collections a great success. Full information can be obtained from the joint honorary secretaries of the Red Cross South Africa:—Mr. J. Fairbairn, Houses of Parliament, Capetown, and Mr. F. Rowland, Box 1183, Johannesburg.—Yours, etc.,

MILDRED BUXTON.

Dormant Mines of the East Rand.

To the Editor, *South African Mining Journal.*

Sir,—I venture the opinion that the resuscitation of such dormant mines as the Cloverfield and Rand Klips, in view of the vast and successful achievements of the Modder and Van Ryn group (which surround them) would do more to stimulate interest and investment in the Far East Rand auriferous area than anything else I can conceive. My reasons are based on the fact that there are innumerable shareholders, spread far and wide, who hold shares at very high prices in the former mentioned properties, and who naturally ask why these concerns are not given the same chance of development as the prosperous ones adjoining them, for I go so far as asserting that were adequate funds available for their exploitation, my mining knowledge and experience in this district for the past twenty years justifies the belief that we should have added two more to the list of phenomenally prosperous ventures. I hope the sponsors of Cloverfields and Rand Klips will recognise their obligation to shareholders by raising fresh capital as soon as more normal conditions prevail, and by so doing not only restore the confidence and hope of hundreds of suffering and patient high-priced scrip holders, but will help to galvanise this famous district into unprecedented activity, and thus prove the existence of the finest asset South Africa or the Empire possesses.—Yours, etc.,

"EAST RANDER."

Benoni,
October 16th, 1915.

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INCOME TAX.—REPORT ON YEAR'S WORKING.

A REPORT on the working of the Income Tax Act, 1914, has been prepared for submission to the Houses of Parliament. The report covers the twelve months ended June 30, 1915, and was prepared by Mr. J. B. Moffat, Commissioner of Taxes. It appears that the cost of administration was £8,630, which was about 2 per cent. of the tax payable. The Budget estimate was £450,000, and it was thought that there would be 5,000 taxpayers. Both estimates proved to be below the real figures; the assessments made have been 5,742, and the tax payable on these assessments was £482,658, of which £173,558 had been collected up to the end of June. The balance represents the tax of late assessments against which appeals have been made. The report is divided into five sections, as follows:

A.—Return showing number of assessments, amount of taxable incomes and tax payable—(a) for Union and Provinces; (b) for districts for which twenty or more assessments on individuals have been made.

B.—Return of assessments classified according to amount of taxable incomes.

C.—Return of incomes classified according to sources of incomes, and annexure, showing distribution of incomes of individuals according to Provinces.

D.—Return of objections to, and appeals against assessments.

E.—Statement showing tax payable and rates on certain amounts.

The first section shows that the proportion of the income tax payable by companies was sixty-five per cent. and by individuals thirty-five per cent, and that the amounts returned by companies were £5,540,422 (assessed at £5,988,230), and by individuals at £9,454,079 (assessed at £10,068,406). Besides income subject to tax individual assessed returned dividends received from companies liable to income tax or mining profits tax, and, therefore, exempt from income tax amounted to £1,148,611, of which £163,877 was from Natal. It is interesting to learn that taxpayers resident in urban areas numbered 4,494, and in rural areas 646. The residents of the urban areas paid in income tax £154,550, and those in rural areas £12,689. The average taxable income of individuals liable to tax was about £1,959, and Durban tops the list of averages of taxable incomes with £2,575. Port Elizabeth is, however, a close second with £2,272, and Capetown with £2,267. Kimberley's average of taxable incomes is £2,209, Johannesburg £2,068, East London £2,047, Inanda £2,041, and Kingwilliamstown £2,024. Durban's average of incomes, including not taxable dividends, is £2,899. "It might have been expected," adds the report, "that the averages would have been higher in the inland Provinces than in the coastal Provinces. The latter, however, besides deriving portion of their incomes from inland business, have been longer established and return more income from accumulated savings. For instance, individuals in the Cape return £811,715 as income from interests, while those in the Transvaal section only return £280,649."

Return B shows that there are 3,745 persons whose income exceeds £1,001, but are under £2,000, the taxable amount of these being £5,039,344, and the tax £33,860. There are 1,211 persons with incomes over £2,001 and under £5,000, the taxable amount from these being £3,392,129 and the tax £64,124. There are 184 persons whose incomes exceed £5,000, and the taxable amount of the incomes was £1,636,933, and the tax was £69,255. In Natal, 37 per cent. of its taxable incomes are due to trade, and 14 per cent. to interest; in the Cape the figures are 34 per cent. trade, 21 per cent. interest; Free State, 39 per cent. trade, 12 per cent. interest, and 11 per cent. farming; Transvaal, 31 per cent. trade, 25 per cent. interest. Within the Union there are 1,469 incomes of over £1,000 from trade, 155 from liquor, 321 legal professions, 230 medical practitioners, 165 other professions, 168 public service, 777 other services, 293 farming, 27 sugar growing, 240 rents, 392 interest, 148 other sources. The returns in respect to farming show that there are 201 farmers in the Cape whose incomes exceed £1,000, 36 in Natal, 16 in the Transvaal, and 40 in the Free State. There were 705 farmers who paid an income tax, but of these only 100 "elected to have value of stock and produce on hand at the beginning and end of the year." The report closes with an example showing how farmers' accounts should be made out.

Reductions in Overland Coal Rates.

The South African Railway Administration announces that, with effect from October 1st, the overland coal rates for distances exceeding 1,050 miles have been reduced by amounts varying up to 18d. per ton. The reductions do not affect the rates from all the Transvaal collieries to Capetown; but they have the effect of affording better opportunities to more distant collieries in Natal for obtaining a share of the coal trade to the Cape ports and hinterland.

* * * *

Roof and Floor Coverings.

Corrugated iron has been the universal roofing medium in Portuguese East Africa, but a marked tendency is being shown to replace it by material more easily handled and at the same time less conductive of heat. Mr. George A. Chamberlain, American Consul at Lourenço Marques, reports also with regard to floor coverings that there is a promising market for such materials as are easily laid and washed and are at the same time cool. A larger percentage than ever before of roofs is now being constructed of pitch or asphalt or with patened roof covering. British manufacturers should take note that the attention of local builders has not yet been properly drawn to the use of damp-proofing coatings in the form of paints on the outside of concrete, stucco, or brick buildings. It appears that roofings are subjected to a greater strain from sun than moisture. In spite of the variations in temperature, stucco and concrete walls do not crack as a rule, and seem to be adaptable to the climate. Certain American firms have already made efforts to introduce their roofing materials, and it is estimated that during the past year about $4,000 worth of such roofing was sold throughout the Province. Floors in the Province are of two kinds—in the cheaper houses of wood and in the more expensive of parquet, tile, or mosaic. Linoleum is sold in various qualities ranging from 4s. to 10s. per running yard of 6ft. width. The market is described as still in its infancy.

Mr. S. B. Joel is expected to arrive from London this week on a visit to the Rand.

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STOPING METHODS AND DRILLING PROBLEMS ON THE WITWATERSRAND.—V.

[By E. M. Weston, A.S.M.B.]*

Hammer Drills.—To understand the local problem with regard to the introduction of hammer drills for stoping work, we have to consider the success they have obtained in other fields and to compare the conditions with those obtaining here. In America the introduction of hammer drills has resulted in an enormous reduction in the cost of breaking rock, amounting sometimes to halving that cost. The general conditions under which success has been gained have been:

1. Most stoping has been done in steep stopes with the air-feed type of drill, requiring no rigging-up and using solid steel. No great pains have ever been taken to avoid the dust danger, which would have added to the expense considerably.
2. The work has, on the whole, been done in ground much softer than that occurring on the Rand.
3. The great saving of time in rigging-up and taking down, and of weight in hoisting up and lowering down rises and passes, has been an important factor in cost reduction.
4. A great saving of labour as against large piston drills was obtained, since these drills are eminently one-man drills.
5. The results were obtained mainly by intelligent labour subject to discipline and under skilled supervision.
6. The hammer drill has not displaced the small $2\frac{1}{2}$ in. or $2\frac{3}{4}$ in. one-man stoping piston drill where the stopes are flatter, such as those in the North Star mine dipping 30° to 40°, and in the Lake Superior fields.

In Europe intelligent and docile labour, and strict technical control and skill in steel treatment, have enabled hammer drills successfully to displace piston drills for certain work, even in very hard ground. All over the world where speed of advance has been a prime consideration and the ground has not been of excessive hardness, types of hammer drills like the Leyner have performed brilliantly. As the dust trouble is of such supreme importance both socially, financially, and economically on the Rand, I think a great case has been made out for their exclusive use in putting up rises and such like work here, regardless of any other considerations. The general conditions on the Rand are so different, however, as to create a new problem, and the reasons for the many setbacks in the progress of the employment of hammer drills become apparent. We have first the question of labour cost. On the Rand the hammer drill is not a one-man drill. The air-feed type using hollow steel for putting up steep dry holes, in back-stoping and rises, is indeed sometimes worked by one native, but there is always the white supervisor. If dust is to be kept down practically two natives are required, as also in foot-walling. The average drill rate in putting up such rises is very low indeed, and their merit lies in their lightness and the ease with which they are rigged up. Turning now to the stoping type of water-feed drills, such as the Atlas, I have never seen more than three supervised by one white man, and owing to the supposed necessity of rigging a number of bars during each shift the machines were often drilling at a much lower rate than piston drills. The hammer drill that is urgently needed on this field is the stope drill for underhand or breast stoping. This should be simple, if possible, and have no complications, due to passing air or water down the steel. It should be able, however, to drill a down hole and clear itself as well as a piston drill. It should use little air and be able to drill four or five 4 ft. or 5 ft. holes in a shift. It should be one the native can handle himself and one he will take to. Can such a drill be found? I am certain from experiments made that all the component parts of such a drill exist and if certain conditions with regard to drill steel and its sharpening are provided, the stoping problem for narrow stopes is already solved.

Piston versus Hammer Drills.—Let us now turn to piston drills in comparison with hammer drills in stoping on the Rand. So far no hammer drill has been a great success in stoping when used without arm or bar. Machines have been used without mounts for taking up foot-wall, but generally the machine required is so powerful that the ordinary native cannot or will not stand the vibration. In steep back-stopes per shift usually 8 natives were employed, 2 for each machine, one to supply steel and another to rig bars, etc. It was true that the machine could be run by one native, but the drilling rate fell off so greatly that the machine was not worth running. With drills of the Leyner type usually the same arms and bars are employed as with $3\frac{1}{4}$ in. machines, and the time spent in rigging up is about the same. Where special care and skill have been applied to sharpening and maintaining drill steel, and where plenty of spare machines or the services of an underground rock drill fitter are available, even in hard ground better drilling efficiency than that usual with piston drills is being gained. In development work a great advantage is gained in drilling dry holes. Good work is also being accomplished in stoping, but I have never heard of any miner supervising more than two or three machines. Generally speaking, much more attention has been forced on those seeking for success with this type on the necessity of paying attention to drill steel and not attempting to drill more 12 or 18 in. with one bit. Even when this is done much efficiency is lost, and machines using solid steel and mounted on air feeds have been used with success, though dust has always been a trouble. Piston machines could not, of course, compete in this work. Most of the ore to be broken in the future will be from stopes having a dip from 50° to 30°. Except that a somewhat lighter arm and bar might be used there will be little advantage in rigging with the hammer against the piston drill. In such stopes the best style of breaking and removing rock is breast stoping. With the newer styles of chucks in use with piston drills the time taken to change jumpers is very much the same, and the manipulation and adjustment to new holes of the smaller stope drills is quickly effected. Turning now to the question of drill speed, experiments have shown that $2\frac{3}{4}$ to $2\frac{1}{2}$ in. piston drills, when not asked to drive a drill bit of too large a diameter, easily attain a drilling speed of 4 to 6 in. per minute, which is ample for all requirements. I have shown that the large 3 in. piston drill is nearly always working at a very low efficiency, due to hoses being too small to start with and their being always damaged more or less, so that the machine, even if the pressure be adequate, is never properly supplied with air. I have shown that the question of the supply and quality of drill steel and its sharpening, as supplied to piston drills, has never had anything like the attention which users of hammer drills have been forced to bestow upon the subject. In stopes of moderate dip also, the most natural manner of stoping is by carrying benches down and drilling down-holes, and no type of hammer drill works so efficiently in down-holes as in up-holes. I have already expressed the opinion, based on experiment, that the rate of drilling of small piston drills could be greatly raised by using hollow steel. In the matter of air consumption, honours are easy. The Leyner drill certainly uses less air than the ordinary large piston drill, but it uses much more than the Konomax. As far as I can judge, the cheapest way to drill rock in stope benches, as far as air consumption is concerned, is to use $2\frac{5}{8}$ or $2\frac{3}{4}$ in. Konomax drills in down holes. The Konomax principle, though most suited for hammer drills, has not so far been embodied in a hammer stope drill. The small $2\frac{1}{2}$ or $2\frac{3}{4}$ in. piston drill can be moved to another bar almost as rapidly as any hammer drill. The inefficiency which exists in its use to-day is largely due to ignorance of its right use and to labour difficulties. There is room for great progress in drill rigging, and if arrangements were made always to have ready for the miner one long arm rigged between two bars much better work could be done. Turning again to labour cost comparisons, there is no doubt that the small piston drill is the more economical in labour of the two. One white man can supervise from 4 to 6 of these machines, though, personally, I think efficiency suffers when more than 4 are given to one man, except perhaps in very flat stopes under most favourable circumstances. We must not here make the mistake of confusing labour cost per machine, which may be small, with labour cost per foot drilled. Where, for instance, two Leyners are drilling in a stope 8 or 10 effective holes per shift, even if one man looks after only two, better results are being obtained than by one man looking after 3 piston drills drilling 6 holes each. Drilling power, if it be produced in sufficient amount, pays for the increase of all other costs and must of itself automatically reduce others. If but half the work of supervision that I have seen put in some mines to make hammer drills a success were devoted along right lines to improving the work of piston drills very interesting results could be obtained.

Training Labour.—The whole matter is largely one of lack of knowledge as to what are the right lines of advance and the lack of any attempt to give systematic training along right lines to the large number of fairly intelligent white workers who drift into the industry and pick up wrong methods of doing work. Mine captains and shift bosses are inspired by no established doctrine of what are the real lines of advance and how to strive to obtain them. Among all classes engaged underground there is an ignorance of the laws of blasting and how forces should be applied to break rock to the best advantage, of how explosives really act and how they cannot act, of the doctrine of free faces and their height as applied to the burden to be given to stoping holes, of the law of the relation of explosive necessary to break out holes to the burden given them, of the question of the right length of hole to bore under given conditions, and for one to drill. These matters I have tried to discuss in a pamphlet entitled "Practical Mining on the Rand," and if the maxims and laws laid down there are right the path along which progress can be made is fairly well mapped out. The worker, however, must be educated to right knowledge of them. This can be done only slowly and on a small scale at first, but if in every mine one has only two or three men working on right lines the results soon attract interest, and these men may be used to educate others. I believe the correct line of advance is the education of a certain number of stopers. Experiments should be made directed toward improving the work of piston stope drills along the line suggested; especially with a view to drilling more holes and, perhaps, shorter holes in narrow stopes. Experiments are needed to adapt a hammer drill for use of one native in stoping with down-holes to displace hammer boys. By using hollow steel in the way mentioned with regard to small piston drills and making the drill pump out its own cuttings, I know by experiment that this can easily be done. It only needs a few months work to find the right type of steel and drill. Experiments have already plainly shown the path of success here. It would pay each mining group to engage an official as a sort of stoping inspector. He could find much work to do in assisting consulting engineers. He should be primarily an underground man. He should investigate on each mine the stoping problem, and should be able to teach a few miners in each mine the best methods to employ. He should also be able to

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*In the *Mining Magazine*.

carry out trials and experiments under practical conditions to find out new lines af advance. The mining industry is well pelased, as I have pointed out, to spend thousands to save but 1d. to 2d. in the cyanide department, but is content to leave far more important matters in the hands of already overworked mine officials. There is a possibility of saving a shilling a ton in stoping costs, and this sum can be saved if the best technical knowledge, underground experience, and educational capabilities are employed on the problem. There is yet one other consideration. The cost of compensation for miner's phthisis is now 5d. per ton milled on the Rand. If the use of water-feed hammer drills will cause this disease to disappear, then this sum will more than pay for any extra expense of maintenance of this type and its steel. If we were sure that any phthisis that is being contracted were due to dust formed while drilling with piston drills, then humanitarian motives alone would require that they be replaced for all development work.

Building Activity. Eight municipalities in the Transvaal during September approved of building plans having an estimated value of £102,788, against £90,602 in August. Ten in the Cape passed plans valued at £35,085. The Durban Corporation have passed plans value £21,498, and Bloemfontein £4,367. Of the Transvaal aggregate, Johannesburg accounted for £57,176, Benoni £13,152, Boksburg £3,149, Germiston £9,429, Krugersdorp £1,055, Roodepoort £1,210, Pretoria £6,047, and Springs £11,570. In addition to the above the Government accepted tenders for public buildings to the value of £26,311.

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Rand Industries. The last monthly report of the Labour Department gives the following account of local industrial activity:—Building trades: Work is increasing in all directions, and the different branches are coming into operation as construction progresses. Although the class of buildings are not to be compared in general with that previous to the slump, the value of the work in hand and in prospect is being well maintained. Engineering: Work in the different departments of the heavier metal trades is continuing active, and skilled hands are fairly well employed, with indications that more of the formerly imported work is likely to be done locally, and keep the trades in the engineering branches well employed. Printing is undergoing some improvement at present. Business has been improving slightly in a general way, while additional political literature has given a bit of a spurt to the trade. Printers had a bad spell, and the improvement is welcomed. Shop-fitting is not so brisk. Machine joinery (including cabinet-making) continues to make headway, particularly in the furniture department. The increase in this class of local manufacture has been very substantial during the last few months. Upholstering is also sharing in the advance of furniture and local production and mattress-making is also increasing in wire work and other lines. Tailoring continues in a satisfactory condition, and if judged by the late hours at work in several of the workrooms they must be extremely busy. Stamped tinware: Employment in the production of tinwares is continuing quite active, and has every appearance of an increase in the output. Milling: Not working up to their full capacity, and the fluctuating prices which are liable to take place in wheat has a bad effect on the industry. Mining continues as usual, with abundant employment for every qualified miner. Uncertainty in securing imported material in most of the industries is a common complaint.

Falcon Mines

For the quarter ended June 30 last the Falcon Mines made a working profit of £7,700. A significant footnote is attached, however, to the effect that this profit is based on copper at £50 per ton. It is added that should the unsold copper realise the average price of £70, the profit would be increased to £23,000. In view of the continued demand for the metal and the maintenance of the price round about £70 the company should be doing well.

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THE WATER SUPPLY OF THE RAND.—XI.

[By W. Ingham, Chief Engineer, Rand Water Board.]*

The amount of radiant heat which can be obtained per square foot above the atmosphere is approximately 7·12 B.T.U.'s, but there are certain losses in passing through the atmosphere which varies with the climatic conditions. The Meida plant, near Cairo, has not been a commercial success, but I see no reason why sun power cannot be economically utilised in places such as the Sahara Desert, which has an area of 3½ million square miles, where the cost of coal is high, or unobtainable.

Prieska-Kalkfontein Military Railway.

I desire to take this opportunity of expressing our appreciation of the excellent work carried out by the Engineer-in-Chief of the S.A. Railways, Mr. A. M. Tippet, M.Inst.C.E., and his assistants, in the construction of the railway line from Prieska to the border of German South-West Africa, and thence to Kalkfontein, the southern terminus of the German South-West African railway system. The distance from Prieska to Upington is 142½ miles and the actual work of surveying the line commenced on the 21st August, 1914. Plate-laying was commenced on 7th September, and completed by November 20th last year—a period of 75 days. This gives an average rate of 2¼ miles per day, although it should be noted that on one day no less than 3¼ miles of railway were laid. The progress on the section from Upington to Nakob, a distance of 88¼ miles, was not so great as that on the Prieska-Upington section, as enormous difficulties had to be faced. Owing to the floods, which extended from the beginning of December to the end of March, during the greater part of which period work on the military bridge had necessarily to be held up, it was decided to construct slip-ways and operate a train ferry across the river. This arrangement was successfully brought into operation on the 13th March, and enabled some 34 miles of track and three engines to be transported from the south to the north bank of the river, so that, by the time the floods had subsided and the temporary railway bridge had been completed, 34 miles of track out of 88¼ miles on the northern bank of the Orange River had been finished. The first engine was transported across the Orange River by the pontoon on March 21st, but the transportation of troops and supplies had to be carried out during the construction of the line, and this naturally retarded progress. The supply of material for this line was one of great difficulty, as it involved the relaying of several sections of branch lines in order that the requisite material might be forthcoming sufficiently early to allow of the work proceeding without interruption. It will, therefore, be seen that approximately two months were necessary for the complete laying of the track from Upington to Nakob, or, say, an average of 1½ miles a day, including sidings. The remaining section of the line from Nakob to link up with the German railway system at Kalkfontein, a distance of 84 miles, was pushed on and successfully completed on the 25th June. The total length of the new line from Prieska to Kalkfontein is 314½ miles, and this was completed between the 7th September, 1914, and June 25th, 1915. Towards the completion of this section, it should be mentioned that no less than 5 1-5 miles of railway line were laid during a period of twenty-four hours. The total distance from Johannesburg to Kalkfontein is 991½ miles, and from Johannesburg to Windhuk 1,331½ miles. The construction of this line, in such a short time, is a piece of work which South African engineers are proud of, and I am quite sure that the Institution will offer their sincere congratulations to Mr. Tippet, M.Inst.C.E., the Engineer-in-Chief, and his able assistants, Mr. M. D. Robinson, M.Inst.C.E., the Engineer-in-Charge of New Construction, Mr. N. K. Prettejohn, the Resident Engineer, and the Bridge Engineer, Mr. J. Mackenzie, M.Inst.C.E., and their respective staffs, on the successful completion of this magnificent piece of work. I also understand that excellent work has been done on the Railways in German South-West Africa by Lt.-Colonel Collins and Major Beaton (Assistant Engineer-in-Chief) in re-laying and repairing the lines damaged during the retreat of the German Army.

Irrigation and Conservation of Water.

Irrigation in this country is practically in its infancy, but a great improvement has taken place during the last ten years. The Union has been divided into districts known as irrigation circles, and the circle engineers who are under the Director of Irrigation (Mr. F. E. Kanthack, M.Inst.C.E.) are doing excellent work in advising the farmers as to the feasibility of irrigation schemes. In the Census Report, 1911, part IX., page 1254, it is stated that the area of land under irrigation within the Union is as follows:—Cape Province, 282,367 morgen; Natal, 18,671 morgen; Transvaal, 113,756 morgen; Orange Free State, 49,308 morgen; total area, 464,102 morgen, or, say, about one million acres. The formation of Water Boards has been mainly instrumental in increasing the area under irrigation and the schemes, either under construction or recently completed, will add a further 200,000 acres to the irrigation area of the Union. South Africa is not, however, a country where large irrigation schemes similar to those in India, Egypt and America can be carried out. It is a country of small and medium schemes, ranging from 100 acres to about 30,000 acres. The Government provides loans on reasonable terms to private farmers and companies, for constructing irrigation schemes. The interest charged is only 3¾ per cent., so it is probable that the Government is losing at present about one per cent. on the loans if the cost of working the department is taken into consideration. Whether this is desirable or not, I am not in a position to say, but it does appear to be bolstering up the farmer at the expense of the inhabitants of the town. The loan has, of course, to be repaid in a period of years, and the period is fixed by the Director of Irrigation and the Government are protected by a first bond on the property. The Irrigation Act of 1912 has placed the allocation of water for irrigation on a much firmer and fairer basis, although, of course, there is still room for improvement. By making the whole of the rivers of South Africa "Public Waters" under Government control, it is now possible to carry out irrigation schemes which would otherwise have been impossible owing to the presumed rights of private individuals. The conservation of water in our rivers is a matter which should receive the serious consideration of the State. There are plenty of sites on our rivers where dams or barrages could be erected at a reasonable cost if the farmers will only join together and form Irrigation Boards. The cost of building weirs on large rivers is too high to warrant, in most cases, a farmer in building one for his own use only. The construction of irrigation works has a considerable influence in improving the value of a country, for instead of allowing the best soil to be washed away to the sea, it is returned to the irrigated lands, and this tends to increase their value. Some idea of the amount of soil which is annually lost to a country unless it is retained on irrigated land can be obtained by the quantity taken away by the Vaal River up to the site of the proposed barrage, which is about 25 miles below Vereeniging. The catchment area is about 17,119 square miles, and during a fairly wet year 100,000 million gallons of water flows past that point. The average silt contents in such a year may be taken approximately at 750 parts per million by weight, therefore no less than 375,000 tons of silt are taken away by the river during a period of twelve months. This quantity would cover an area of 345 acres 6 inches deep. Sir W. Willcocks estimates that the River Nile discharges 13,000,000 million gallons of water into the Mediterranean during an average year, and the total solid matter contained in that quantity of water is no less than 36,000,000 tons.

(To be continued.)

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* From Presidential Address read before the S.A.I. of E.

GOERZ GROUP.—QUARTERLY REPORTS.

MAY CONSOLIDATED.

The directors' report of the May Consolidated G.M. Co. for the quarter ended 30th September shows the revenue to be £33,464 12s. 2d., equal to 15s. 5·5d. per ton. The working profit was £3,008 14s. 2d., and sundry revenue £139 1s5. 1d. No allowance is made in above figures for Profits or Special War Taxes. Summary of operations: Mined, 46,945 tons; waste sorted out (equal to 6·9 per cent.), 3,255 tons; milled, 43,290 tons; number of stamps, 100, ran 84·5 days; sands treated, 22,520 tons; concentrates treated, 4,203 tons; slimes treated, 16,280 tons. The results of the quarter under review as compared with the previous one, show that the yield per ton improved by 7·5d., and the working costs increased by 5·8d. per ton; the tonnage milled was more by 490 tons, and the working profit increased by £365.

GEDULD PROPRIETARY MINES.

The directors report of the Geduld Proprietary Mines for the quarter ended 30th September shows total revenue to be £120,668 13s. 11d., equal to £1 10s. 11·5d. per ton; the working profit was £36,620 5s. 2d., while sundry revenue came to £3,489 15s. 1d. In the above figures no allowance is made for Profits Tax or Special War Tax. On capital account there was expended £20,714 12s. 1d.; while the charge for excess mine development came to £340 11s. Summary of operations: Mined, 84,379 tons; waste sorted out (equal to 7·1 per cent.), 6,029 tons; milled, 77,950 tons; number of stamps, 60, ran 86·2 days; number of tube mills, 5, ran 87·4 days; sands treated, 31,364 tons; slimes treated, 17,060 tons. Shaft sinking, 275 feet; development, 3,261½ feet. The footage sampled totalled 2,420 feet, assaying 7·0 dwts. over 38·2 inches. Shareholders were informed on the 1st instant, through the Press, that the board have decided to increase the reduction plant to a crushing capacity of 40,000 tons per month, the increase being made so as to permit of a still further addition at the minimum expenditure, and development will be continued full speed with this end in view. The increased plant is expected to be in operation before the end of next year. There will be no interference with the payment of dividends, as the funds necessary for the expenditure are in hand. The figures for the past three months, when compared with the previous period, show that 3,190 more tons were milled, and the working costs were reduced by 9·2d. per ton, whereas the yield per ton was lower by 4·2d.; the net result being an increase in the working profit of £3,045. The supply of labour is ample.

PRINCESS ESTATE.

The directors' report of the Princess Estate and G.M. Co. for the quarter ended 30th September shows a tatal revenue of £85,559 4s. 6d., equal to £1 5s. 8·3d. per ton.; working profit, £477 14s. 4d.; sundry revenue, £579 6s. 1d. In the above figures no allowance is made for Profits Tax or for Special War Tax. There was expended on capital account £5,381 16s. 6d.; mine development redemption charged to working expenses, £8,325; expended on mine development, £6,351 7s. 2d. Summary of operations: Mined, 84,993 tons; waste sorted out (equal to 22·7 per cent.), 19,298 tons; ore taken from surface dump, 455 tons; milled, 66,600 tons; number of stamps, 60, ran 86·4 days; number of tube mills, 5, ran 73·5 days; sands treated, 26,035 tons; slimes treated, 10,755 tons. Shaft sinking, 2 feet; stripping, 14 feet; station works, 6,600 cubic feet; development, 1,330 feet. The footage sampled was as follows: South Reef, 345 feet, averaging 8·4 dwts. over 25 inches; Main Reef, 625 feet, averaging 6·7 dwts. over 47 inches. It is estimated that the payable ore (based on the milling width) developed by the above footage is: South Reef, 18,296 tons; Main Reef, 33,959 tons. The above figures, when compared with the previous quarter, show that 100 more tons were crushed, the yield per ton was slightly better by 1·2d., whereas the working costs were higher by 2·3d. per ton; the net result being a decrease in the working profit of £302.

MODDERFONTEIN DEEP LEVELS.

The directors' report of the Modderfontein Deep Levels for the quarter ended 30th September shows a total revenue of £189,389 8s., equal to £1 16s. 9·3d. per ton; working profit, £104,197 14s. 3d.; sundry revenue, £395 3s. 6d. In the above figures no allowance is made for Profits Tax or for Special War Tax. Capital expenditure, £1,993 12s. 1d. Summary of operations: Mined, 114,294 tons.; ore from surface dump, 2,268 tons; waste sorted out (equal to 11·8 per cent.), 13,762 tons; milled, 103,000 tons; number of stamps, 60, ran 77·13 days; number of tube mills, 6, ran 75·68 days; sands treated, 44,400 tons; slimes treated, 57,150 tons. Development, 1,354 feet. The footage sampled totalled 1,130 feet, assaying 14·3 dwts. over 44 inches. Shareholders were informed on 28th July last, through the Press, that the board have decided to increase the capacity of the reduction plant by an addition of 10 stamps, which will enable the company to crush 40,000 tons per month. It is expected that the work will be completed about the middle of next year. The cost of the additional plant has been estimated at £23,000. The above results, when compared with the previous quarter, show further improvement. Six thousand more tons were milled and the yield per ton was better by 2s. 2·6d. Costs were reduced by 2·7d. per ton, and the working profit shows an increase of £17,895. The results of development, as will be noted from above particulars, continue to be most satisfactory.

Glynn's Lydenburg.

The directors report of the Glynn's Lydenburg for the three months ended 31st July shows a revenue of £20,738, equal to 33s. 11·1d. per ton., and a working profit of £8,567, equal to 14s. 0·2d. per ton. The net capital expenditure was £826 11s. 8d. The amount unexpended on authorised votes at 31st July was £2,940. The 593 feet of development work done on the Werf Mynpacht during the quarter ended 30th April exposed 200 feet of payable reef, value 9 dwts. over 8·9 inches. 368 feet of development work were done on the Werf Mynpacht during the quarter, exposing 60 feet of payable reef, value 8 dwts. over 8 inches. The comparatively small footage of reef exposure was due to the undulating character of the reef, which at times passes into the hanging wall and at other times into the footwall. Total yield, 4,867·442 fine ozs.; total yield per ton, 7·962 dwts. The grade was low during the quarter owing to the fact that a considerable proportion of the ore mined was taken from the northern portion of the Battery Section of Mill Hill, where the ore is of a low grade but payable. During the greater part of the quarter under review the work of cleaning up and re-timbering drives in the Werf Mynpacht, damaged by the floods in January last, has been in progress. This is now completed, and development work has been resumed. The water in this section is now under control, and more rapid progress is anticipated. An interim dividend, No. 28, of 10 per cent. was declared on the 22nd July, payable to shareholders registered at 31st July. The rainfall for the quarter was 4·51 inches on 19 days, as compared with 1·73 inches on 14 days for the corresponding period last year.

NOTICE: To Mine Managers & Others

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Mine Safety, Sanitation, and Welfare Bulletin.

MINE MANAGERS' VIEWS ON SAFETY IN MINING.—II.

THE following is the conclusion of the proceedings at the recent mine safety congress at San Francisco:—

It was agreed that a "leaser" is not the same as a "lessee," that the ordinary legal significance of the latter does not apply to the man who has limited rights to work in a part of a mine under strict conditions. A "leaser" is an employee; a "lessee," a tenant not subject to orders but operating on his own account. The use of grease or oil to water-proof joints between cap and fuse was condemned, as causing misfires and otherwise dangerous. Instead, roofing paint was recommended for this purpose. Also ordinary white laundry soap. It was the opinion of many that it was safer to ride on a loaded skip, being more likely to stay on the track, than on an empty skip, in certain mines where the factor of safety of the rope is ample, and the track is somewhat rough, or where the construction of the skip is such as to admit of the possibility of its being over-turned when empty. Ordinarily, of course, it is not considered safe to ride on a loaded skip because of the danger of falling off, and the probability that if the rope breaks it will do so when under the strain of the load. All injuries or accidents, it was decided, should be reported before going off shift, because many slight abrasions and hurts become serious, especially in coppery water, if not given medical attention. The shift boss received proper recognition it being agreed that reports concerning conditions underground, such as dangerous places and the like, should be reported to him. In many rules the shift-boss was coupled with the foreman. It was suggested that no man should "spit" more than 15 fuses at one time without another man to assist him. On the other hand, an opinion was expressed that there are many miners who get excited when a fuse does not ignite quickly, and when they have to cut it again to make it "take" they lose their heads. It depends upon the position of the working-face, that is, the facility for an easy exit to safety. In a drift a miner can spit 15 or 20 fuses comfortably, but in the bottom of a winze, where escape means the climbing of a chain-ladder, and so forth, 5 fuses would be enough.

Testimony was given that in firing holes surer results were obtained with fuse than with electrical firing. Also that the use of the lighting circuit was more satisfactory than a battery. As to returning to a place where a charge has been exploded, it was held that in a well ventilated mine an interval of 15 minutes would suffice to ensure the escape of fume and also the danger of missed holes; but it was stated that the Bureau of Mines had a record of shots that went off three hours after the fuse was "spit," and even longer. Forty minutes was suggested as a compromise. The use of shower-baths in change-houses has decreased many kinds of infection, where the men have been persuaded to use them It was argued, however, that a change-house is not a "place of employment" and that therefore the use of either the change-house or its shower-bath could not be made compulsory on the men nor the providing of it compulsory on the mineowner. It is a place to which the miner goes *after* he has done his work. On the other hand, the change-house and its conveniences minister to the "welfare" of the worker and to the ability of the owner to restrict the stealing of rich ore. The "place of employment" is the employer's premises, where the workman is under the authority of the employer. Therefore, this comes under the jurisdiction of the Industrial Commission or similar authority. In regard to oil underground, it was agreed that the quantity did not matter so much as the place where it was kept. A sone manager said: "If the oil is kept in a place distant from timbers and is not likely therefore to leak and soak into the timbers and catch fire, the quantity cuts no figure. The oil itself is not readily inflammable, but it is the timber soaked with oil that is inflammable." The question arose as to whether dynamite should be carried on a car next to an electric locomotive underground. It was suggested that the dangerous load should be placed on a rear car, that an empty car should intervene, or that a long coupling should be used, so as to keep the dynamite car away from the trolley and prevent a vagrant spark from dropping on the dynamite. A regulation might be framed providing that the dynamite-car should be separated from the locomotive by a fixed distance. The question was left undecided Red wrappers are used on dynamite cartridges at many mines. It is claimed that the red wrapper is more effective in making cartridges visible and in aiding the detection of them in broken ore than the brown. The companies supplying explosives do not charge extra for the red wrapper now, but they used to charge $\frac{1}{2}$ cent. apiece. Owing to the War and the scarcity of aniline dyes, the supply of these red wrappers has run short, but this is to be corrected by the end of the current year. It was stated that the red wrapper was adopted during the driving of the Simplon tunnel. It was found to lessen accidents. Then it was introduced at the Mammoth mine, in Shasta county. As the manager of that mine said: "It is much more easily distinguished in broken ground, and in the faces where the powder remains in the drill-holes you can see the red wrapper 20 feet away, but with the other wrappers it was not unusual for men working in the face not to know powder was there." The use of water on burning "powder" tends to increase the danger, according to the chemists of the Bureau of Mines. Incidentally, it is noteworthy that "powder" is used as a synonym for dynamite, thus perpetuating a term inherited from an earlier period when sporting powder was the usual explosive. Among fire-extinguishers, those using pyrene were mentioned as less dangerous than those using soda and acid, the latter being on a par with water. Sand was said to b eused in Arizona to extinguish dynamite fires, but no faith was expressed in this method. Signs to indicate where blasting is in progress outside regular hours are desirable. It was suggested that "the time of all blasting and firing shall be fixed by the superintendent, and notices giving the times of firing shall be posted in prominent places at the entrance of the workings, and at the various shaft-stations. No firing shall be done at other than the stated time unless all entrances to the working place are guarded by men or by placing in the "travelling ways" signs of warning or red alarm lights. Such protection shall be given at the bottom of raises and at the top of winzes, and also in the working-levels." The relative merits of strap-iron and T rails were debated. Opinion was evenly divided. For incline-shafts the strap-iron was especially suitable. It was recommended in shafts where the live load is less than 4,000 pounds and the rope-speed not over 300 feet per minute, provided that the strap-iron is bolted through the stringers. tI is easier to make an inspection of a shaft with T rails than of one equipped with strap-iron. If the end of a strap is loose, it is discovered only when the skip passes and is jarred. A loose bolt is not readily detected by looking under the track. One engineer asserted that heavy iron, such as $\frac{5}{8}$ in., properly bolted, was as safe as any T rail. Frederick Hellmann, formerly manager of the East Rand Proprietary, was quoted as having stated that the best installation for a rope-hoist in an incline shaft consisted of longitudinal stringers equipped with heavy strap-iron. The Tennessee Copper Co. was said to hoist 3,000 ft. on a 75° incline, using strap-iron made to conform to their design. It was complained that to forbid the use of strap-iron would be a hardship to small operators, especially those at a distance from the railroad or from waggon-roads. Any visitor to the hoist-room must remain in sight of the engineer while the hoist is in motion. This refers to officials who have some business there. It makes the engineer nervous for anybody to come into the room and get behind where he cannot be seen. It was suggested that all visitors be excluded. Marked difference of opinion was elicited in regard to the use of wood and pipe rails as against chains, for guarding the approach to a shaft. The weight of one and the sagging of the other were given as defects. It was argued that a chain was easy to detach and throw aside when necessary, while a wooden bar is heavy, especially when wet. When employing a pipe-railing it is usual to have a centre-post, which gets in the way when timbers are being loaded. If the centre-post is removable, it may fall into the shaft. On the other hand, the chain must be loose in order to allow play for hooking it; then it sags and may cause a man to trip. If tight, it is difficult to hook and the men leave it unhooked. The guarding of shafts, it was agreed, was so important that the matter was referred back to the committee.

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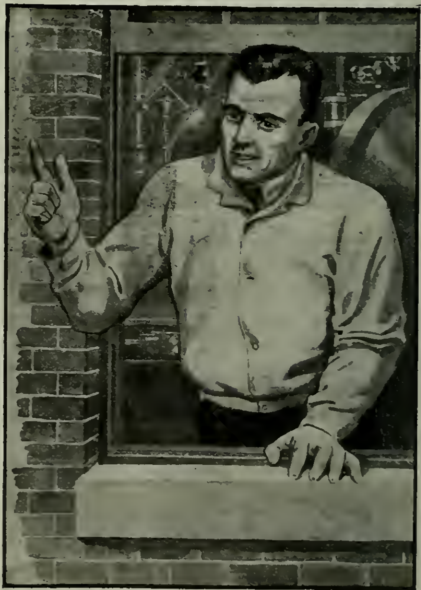

THE WEEK IN THE SHAREMARKET.

Election Results Produce Immediate Effect—Restoring Confidence—Improving Tendency.

ALMOST complete stagnation marked the days before the elections, and an equally marked spurt in prices and activity followed them. The net effect of the news on Thursday was to improve prices all round, and to restore confidence that had suffered sorely from the events of the recent past. That General Botha's success will have an excellent effect in London goes without saying, and granted that the immediate business of "Cabinet-making" gives no trouble, everything South African should be looked upon with growing favour by investors. Of course, the war conditions under which dealings are carried on still overshadow everything; and a real improvement must be postponed until circumstances permit of their relaxation.

	Frid. 15th.	Sat. 16th	Mon. 18th	Tues. 19th.	Wed. 20th.	Thurs. 21st.
African Farms	7 3*	7 9	8 3	7 9*	—	7 9
Apex Mines	16 3*	16 3*	16 0*	16 6*	—	17 0
Aurora Wests	8 0*	—	8 0*	8 0*	—	8 6
Bantjes Cons.	6 0†	5 7*	5 6*	5 6*	—	5 6*
Blaauwbosch Dias.	—	—	—	42 6*	—	—
Brakpan Mines	61 0†	61 0†	61 0†	60 6†	—	61 0
Brick and Potteries	5 0*	—	—	5 0*	—	5 0
Bushveld Tins	0 2*	—	0 3†	—	—	0 2
Cassel Coals	19 0*	19 0*	19 0*	19 0*	—	19 0*
Cinderella Cons.	2 9*	—	—	—	—	—
City and Subs.	42 0†	41 0*	41 6*	41 9	—	42 0
City Deeps	62 0†	61 0	62 6	63 0*	—	64 6
Cloverfield Mines	5 3*	5 5*	5 4*	5 4*	—	5 6*
Clydesdale Colls.	12 0*	12 0*	12 0*	12 3*	—	12 0*
Concrete Construc.	—	—	—	2 0	—	1 0*
Con. Investments	—	14 9*	14 9*	16 0†	—	14 9*
Con. Langlaagtes	—	37 0*	37 0*	37 0*	—	—
Con. Main Reefs	18 9*	18 9*	18 9*	18 9	—	19 0
Con. Mines Selection	9 3*	—	—	9 3*	—	9 3*
Coronation Colls.	—	25 0*	25 0*	25 0*	—	25 0*
Coronation Freeholds	0 3†	—	—	—	—	0 2*
Crown Diamonds	—	1 0*	1 0*	1 3*	—	—
Crown Mines	—	75 0†	60 0*	—	—	70 0*
Crown Mines Deb.	£98*	£93*	£98*	£98*	—	£98*
East Rand Centrals	2 7*	2 6*	2 6*	2 8*	—	2 9*
East Rand Coals	2 0*	2 1*	2 2*	2 3*	—	2 5*
East Rand Deeps	1 3*	1 3*	1 3*	1 3*	—	1 3
East Rand Props.	21 0*	21 0*	21 9	21 9*	—	21 9*
East Rand Debs.	—	£98*	—	—	—	—
Eastern Golds	1 3*	1 3*	1 3*	1 3*	—	1 6
Frank Smith Diams.	1 3*	1 3*	1 3*	1 0*	—	1 5
Geduld Props.	32 3	32 0*	32 6	32 3*	—	32 6
Glencairns	2 1*	2 1*	2 2*	2 1*	—	2 1*
Goerz & Co.	12 0*	12 0*	—	—	—	12 0*
Government Areas	23 6	24 0*	24 0*	24 0*	—	24 3
Joh. Board of Ex.	—	—	—	19 0*	—	—
Jupiters	5 6*	5 9*	6 0	—	—	6 6
Klerksdorp Props.	1 1*	1 4*	1 6	—	—	1 6*
Knight Centrals	9 6*	9 10*	9 9*	10 4	—	11 1
Lace Props.	3 3*	3 6	3 5*	3 5	—	3 9
Luipaardsvlei Est.	7 3†	7 0*	7 0*	7 0*	—	7 0*
Lydenburg Farms	3 11	4 0	4 0	4 6	—	6 2
Main Reef Wests	6 9*	6 9*	6 9*	6 9	—	6 9*
Meyer & Charlton	—	102 6*	102 6*	102 6*	—	102 6*
Middelvlei Est.	1 4*	1 4*	1 4*	1 1	—	1 4*
Modder B	110 0*	110 0*	110 0*	110 0*	—	111 0
Modder Deeps	97 6*	97 6	97 6	97 3	—	98 6*
New Boksburgs	0 10*	0 10*	0 10	0 10*	—	—
New Eland Diams.	—	—	6 0*	—	—	10 0†
New Era Cons	6 4*	6 3*	6 6*	6 6*	—	6 7*
New Geduld Deeps	2 4*	2 3*	2 3*	2 4*	—	2 4*
New Kleinfonteins	23 6	23 3	23 3*	23 9	—	24 6
New Moderfonteins	302 6*	302 6*	306 0*	308 6*	—	302 6*
New Primrose	—	—	8 0*	8 3*	—	8 3*
New Rietfonteins	0 4†	0 4†	—	—	—	0 3*
New Unifieds	15 9*	15 9*	15 9*	15 9*	—	16 0*
Pretoria Cements	43 6*	43 6*	—	44 0*	—	44 3*
Prince's Ests.	—	3 6*	3 6*	3 6*	—	3 6*
Rand Collieries	—	—	—	2 6†	—	—
Rand Klips	1 1	1 1*	1 1*	1 2	—	1 4
Rand Nucleus	1 4	—	1 4*	1 4*	—	1 4*
Randfontein Deeps	2 9*	2 7*	—	2 0*	—	2 6*
Robinson Deeps	—	20 0*	20 0*	20 0*	—	—
Rooibergs	14 3*	14 3*	14 3*	14 3*	—	14 6*

A Ex London. B Odd lots. * Buyers. †Sellers

	Frid. 15th.	Sat. 16th.	Mon. 18th.	Tues. 19th.	Wed. 20th.	Thurs. 21st
Roodepoort Uniteds	3 0*	3 0*	—	3 0*	—	3 0*
Ryan Nigels	—	2 6	—	4 0†	—	—
Shebas	2 0†	—	2 0†	2 0†	—	2 0†
Simmer & Jack	9 0*	—	—	—	—	—
Simmer Deeps	1 9†	—	1 6*	1 9†	—	1 6*
S.A. Breweries	31 0*	31 0*	32 0	32 0†	—	32 0†
S.A. Lands	2 6*	2 6*	2 6*	—	—	2 8
Springs Mines	25 9	25 9*	25 9	25 9	—	26 3
Sub-Nigels	11 0†	10 6	10 6*	10 6*	—	11 0
Swaziland Tins	20 0*	—	—	21 0*	—	21 0*
Trans. Coal Trusts	37 9*	38 0*	38 6*	39 6	—	39 3*
Transvaal Lands	11 0*	—	11 0*	11 0*	—	—
Trans. G.M. Ests.	—	—	25 0*	26 0	—	25 6*
Van Ryn Deeps	50 6	50 6*	50 3*	50 3*	—	51 0
Village Deeps	33 0*	32 0*	32 3*	35 0†	—	35 0†
Vogel Con. Deeps	0 6*	—	—	—	—	0 8*
West. Rand Ests.	0 9*					
Witwatersrands	51 6*	—				52 0*
Wit. Deeps	26 6*	26 9*	26 6*	26 9	—	27 3*
Wolhuters	12 3*	12 3	12 0*	12 0*	—	12 0*
Zaaiplaats Tins	13 6*	14 0	14 0	13 9*	—	13 6*
Union S.A. 3½ p.c.	—	—	—	—	—	£97 15
Union S.A. 4 p.c.	—	—	—	—	—	£105 5†

A Ex London. B Odd lots. * Buyers. †Sellers.

Oil Field Structure. The value of even slight folds or bulges as collecting places for petroleum in strata having a monoclinal dip was referred to in some recent articles in the *S.A. Mining Journal* on the prospects of oil in Portuguese East Africa. Interesting evidence in support of this view is given in the July-August number of *Economic Geology*, in which James H. Gardiner has a paper on "The Oil Pools of Southern Oklahoma and Northern Texas." Referring to the Healdton Pool in Oklahoma, the author speaks of the measures increasing in dip at the rate of about 100 feet per mile, except where interrupted by additional folding, and refers to the Petrolia Pool in Northern Texas as an irregular elongated dome, some 200 feet high, and having an area of about seven square miles. In the same issue, by the way, there is a review by R. W. Pack, of Dorsey Hager's recent volume on "Practical Oil Geology," and the reviewer makes the objection that "Mr. Hager has drawn too largely from conditions in the Californian fields, where the structural features are sharply developed, and that he has not mentioned sufficiently the slightly tilted or folded structures of the eastern fields." "This part of the book might well have been enlarged," Mr. Park remarks, "by a more comprehensive treatment of the features that he dismisses with brief and somewhat dogmatic statements."

"*The Mining Manual*, 1915": By Walter R. Skinner. London, 1915. Price, in England, 15s., elsewhere 17s.—The 29th annual issue of Skinner's well known manual, published recently, covers every section of the mining market ,and many mines whose shares are not dealt with on the London Stock Exchange are included. In a world wide industry like that of mining there are continual changes in progress, and consequently to embody every new phase, unwearied labour and much time are absolutely necessary. Neither has been spared to maintain the reputation of the "Mining Manual," which, for completeness and accuracy, has stood unrivalled from its very inception. Every individual notice has been carefully revised and officially verified wherever possible. In previous volumes the work has been divided into sections, but with the present volume all companies are arranged alphabetically. This innovation has been decided upon owing to many of the companies widening their scope of operations and transferring their interests from one mining field or market to another. This has been a notable feature in recent years in connection with many finance companies whose interests have become so divided that although their title suggests a certain field of operation their list of holdings proves otherwise. At the same time the Index has not been abandoned, since it is thought that—especially to those not very familiar with Stock Exchange nomenclature—it will be found helpful for cross-references.

WRIGHT'S ROPES.

"PRACTICAL MINING ON THE RAND."
By E. M. WESTON, A.S.M.B.
This book will help any miner or learner to do better work with hand labour and machines. Price 5/6 post free, from the office of this Journal.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Elections Taken very Seriously—Outlook now Better—Extreme Scarcity of Cement—Timber Trade Conditions Explained.

During the early part of the week the elections were the main subject of conversation, and undoubtedly the sinister forebodings checked business very materially, as there was an undercurrent of feeling uppermost in men's minds that this was not the time to make experiments with new men and new manners at Pretoria, so far at least as the commercial community is concerned. The occasion was considered of such importance that the Commercial Exchange was closed all day (Wednesday)—the election day—as well as the Stock Exchange. On Thursday there was altogether a different feeling, as the town was full of optimism, and although too much revival of business cannot be expected, whilst the great war conditions prevail in Europe, yet a few of the business enterprises temporary held up, as well as new buildings in contemplation, will, no doubt, become realities.

Iron, Steel, Bolts, Nuts, etc.

Owing to the increasing demand for local manufactured iron, the pressure at the works is great, and orders for completion are somewhat behind, but every effort is made to send out the goods as quickly as possible, and, what is more, the orders are taken in turn. The list of prices of imported bolts and nuts has been revised, and duly appear in our list. Large consignments of American steel plates are on the water, and the assortment is a varied one. The wholesale price is expected to range from 20s. to 22s. per 100 lbs. in Johannesburg. This steel is anticipated to get just in time to supply several big orders placed some while ago, "to arrive," which will relieve the local position very considerably, as the demand continues good and stocks are not too plentiful with the merchants.

The Scarcity of Cement.

There is a general complaint throughout the town as to the scarcity of South African cement. The words South African are almost superfluous, as there is no more Portland cement arriving from oversea and none expected until after the war. All the imported cement was bought up by Government contractors for harbour works, and recently the Government has been compelled to accept the South African substitute, as the only alternative was to stop some very important constructive works at the coast. Builders and other contractors also are using the local article, which has made cement very scarce. However, it is satisfactory to be assured by the sales manager for the Pretoria Cement Factory that they have any quantity of the raw material, and since the acute demand has been experienced the works are kept going at full tilt both day and night. He also mentioned that their new factory at Ottoshoop is nearing completion, which obviously will soon add very materially to the Company's output. In the meantime a job in Johannesburg was held up for three days, this week, awaiting cement. That job, it may be interesting to mention, is the only absolute fire proof business premises in Johannesburg, at least that is what the builder claims for it. Several railway contracts have also been delayed awaiting cement supplies. One thing should not be omitted to be recorded, and that is the sales manager rather proudly referred to the fact that their's was purely a South African industry, as nothing had to be imported from overseas except the bags, as all the raw materials connected with the making of cement were found in this country.

Timber and Building Materials.

Timber is in rather a peculiar position, as 6 in. x ⅞ in. flooring boards have advanced from 4d. to 4⅝d., owing to scarcity; against this there have been sales of standard sized deals in extra big lots at a fraction below the recognised price of 9d. per foot. According to the information obtainable it appears that the general merchants are filling up their depleted stocks both in town and along the Reef, as they fear a shortage. However, a large importer does not agree with this, as he has several ships already on the water from the London docks, conveying Baltic timber, therefore a famine for a long while to come is quite out of the question. At the moment the demand is restricted, both from the mines and the building trade. It is said that values are not expected to advance, neither are they expected to recede. Galvanised roofing iron is 7½d. as a minimum price as compared with 7¼d. per foot. All kinds of sundries in sanitary ware, builders' ironmongery, baths and general fittings are much the same as the previous quoted rates. However, prices keep very firm throughout for building materials. Bricks remain the same, but the great difficulty is in the transport, owing to the absence of ox-wagons through want of veld feed for the animals. So much so, that mule wagons have been chartered which represents an extra charge of 5s. per 1,000. A mule wagon with eight mules will only carry a thousand bricks, whereas an ox-wagon can be loaded up with 1,250 to 1,500 bricks, and convey them any distance, if time is of no great consequence. Now the elections are over a revival is expected in the building trade generally.

Electrical Goods.

The elections disorganised this business considerably, but great hopes are now entertained that a fairly good spell of prosperity is imminent, more especially as all kinds of electrical goods are fairly plentiful, therefore contracts can be taken with good prospects of continuing work without a break, in waiting for materials. Carbon lamps have not been quite deleted from the lighting zone, as quantities are available at 7s. 6d. per dozen. The economic night lamps, which can be reduced from a sixteen candle power to one candle power, are unobtainable in wholesale lots, and only an occasional few can be had from retail stores. British supplies of all ordinary electrical goods are arriving quite regularly again, considering the war times.

Miscellaneous Trade Items.

Quite a quantity of 8 lb. sheet lead has been sent from here to Durban. Several thousands of copper badges have been supplied by a Johannesburg plumbing house, for the natives at Windhuk, as per a Government order. The scarcity of white glazed and salt-glazed bricks has been obviated by an output of new makes recently coming from the kilns. It is stated that up-to-date machinery is now on the water to prove an oil proposition in the Wakkerstroom district. Galvanised roofing iron is steadier at 7½d. per foot minimum.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; mild steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 45s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per

100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7½d. to 7¾d., 11 ft. 8¼d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6d., 9 ft. 6¼d., 10 ft. 6½d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9½d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4⅝d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 35s. 6d. per cask; Pretoria Portland 8s. 3d. per bag: 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 21s. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 43s. 6d. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; paraffin, 12s. 5d. 2/5; petrol, 22s. 2/4; motor oil, 5s. gall.; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d., per lb, according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; carbon lamps, 7s. 6d. per doz.; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

New Patents.

229 Koering Cyaniding Process Co. and Bruno Richard Koering.—Improvements in process and apparatus for the recovery of metals from their ores.
230. Thomas Hurst.—Shaft tell tale.
231. William Holman James.—A cyanicide and method of producing same
232. Moses Kellow.—Improvements in power-driven rock-drills.
233. Moses Kellow.—Improvements in and in connection with water-driven turbines.
234. Seguin Fisher.—Improvements in rotary hammer mechanisms.
235. Henry Candy and William Young.—Improvements in stamp guides.
236. Catherine Blomefield.—Hot-stuff trench ration.
237. Ole Kornelius Olsen and John Martin Siebert.—Improvements in rope supporting rollers for mine shafts, haulage tracks and the like.
238. William Lippiatt and Edward Dodd.—Improvements in means or apparatus for travelling through a conduit, pipe line or the like, applicable for drawing a cable there-through and for removing obstructions therefrom.
239. William Henry Marston.—A new preparation for use as an embrocation and the like.
240. Thomas Kemplay Irwin.—Improved apparatus for the filtration, aeration and gasification of liquids.
241. Wilhelm Mauss.—Improvements in percussive engines.
242. Wilhelm Mauss.—Improvements in rock drills.
243. James John Wood.—Improvements in talking machines.
244. Robert Wilson.—Improvements in and relating to the building of concrete structures.
245. Rolland Beaumont.—Improvements in bearings for rope rollers.
246. John Penhale.—Improvements in the treatment of zinc-gold slimes.
247. Andrew Frederick Crosse and Frank Campbell Dumat.—An improved process for the treatment of crushed auriferous ore products.
248. Herbert Paine Bray.—Improvements in superheaters for use in connection with steam generators.
249. Oil and Carbon Products, Ltd., and Leon Del Monte Y Aldama.—Improvements relating to the separation of volatile products from solid carbonaceous material.
250. Thomas Holmes.—Improved frame for battery screens.
251. John Lyle Taylor and William James Yates.—An improved means of automatically manufacturing pellets or slugs for air rifles and air guns and the like.

INVESTORS' DIARY.

FORTHCOMING COMPANY MEETINGS.

Oct. 27.—Rooiberg Minerals.
Oct. 29.—Knights Deep.
Nov. 3.—Rand Klip.
Nov. 9.—Johannesburg Consolidated Investment Co.
Nov. 19.—Glynn's Lydenburg.
6th December.—Zaaiplaats Tin Company.

S.A.
MINING YEAR BOOK.
1915.

BY S. R. POTTER.

Vol. I.

ANNUAL MEETINGS AND
REPORTS COMPLETE.

"A complete account of the present position and future prospects of South African mines, put on permanent record for ready reference."—"The Star."

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Engineering Notes and News.

Resuscitation After Electric Shock.

With regard to the best method of resuscitation after electrical accidents, opinions are divided. In England and America the Schäfer method is employed, the victim being laid face downward and pressure applied to the chest at regular intervals. The Sylvester method, practised in Germany, consists of laying the patient on his back and producing artificial respiration by alternately drawing the arms above the head and pressing them down against the chest. This method is regarded by prominent German workers as the only suitable one, the other being physiologically incorrect. Artificial respiration by working the arms to and fro is considered preferable to mechanical devices. Where several helpers are available, the Sylvester method should always be employed. Even oxygen apparatus is condemned in practice by many doctors, whereas others look on oxygen as a cure-all. According to most experience, a distinction should be drawn between cases of suffocation, hanging or drowning, and those of electrical accidents. Whereas, in accidents of the former kinds, oxygen apparatus has frequently proved of value, these appliances have only been found to resuscitate one victim of an electrical accident since their introduction—namely, in Upper Silesia in 1911, whilst in the Dortmund district alone 17 persons have been restored to life by the aid of the Sylvester method after electrical accidents in collieries. Where heart fluttering is concerned, none of these methods is of any avail.

In a recent issue of *The Engineering Magazine*, Mr. L. O. Kellogg contributes an 18-page discussion on "Rock Drills in Mining." This really tells what mining men would like to know about rock-drills, instead of the platitudinous pedantry of dry trivialities that discourages the reader in the customary article on the subject. For the benefit of those who do not see *The Engineering Magazine*, the following condensed extracts are offered :—

"On any particular job of shaft-sinking, driving, or stoping, it is often possible to get nearly as cheap results by hand work, particularly in remote situations, in the softer rocks, or at temporary jobs and doubtful prospects. Within only a few years large and important shafts have been sunk entirely by hand. Still, the machine-drill has considerably reduced mining costs by the indirect methods of making it quicker and easier. It has doubled the speed of sinking, quadrupled the speed of driving, and increased the tonnage broken per driller five or ten-fold. Next to the mine-pump the machine-drill has made modern mining modern. No gasoline or electric-drill has proved thoroughly satisfactory, although electric-drills are possibly successful in coal mining. The Leyner was the first American hammer-machine to make any great stir, and was developed in the West. It (the Water-Leyner or Leyner-Ingersoll) is especially available for flat holes, being not very widely used for shaft-sinking, since in such work the hole-bottom is not kept so clean and there is a loss in efficiency. In raising or in stoping where approximately vertical holes are required, not only is the (water) cleaning not necessary but on the contrary the sludge has a tendency to run down into the machine and make trouble. The stoper followed the Leyner. The first machine consistently successful in this country was the Waugh, also a Western product. For over-hand stoping and raising, the stoper is the most highly efficient machine yet devised. Valveless stopers, such as the Ingersoll-Rand Imperial, are not gaining in popularity. It is simpler than a valve-actuated stoper, but less efficient and wears more rapidly. The first automatically rotating stoper on the American market was put out by the McKiernan-Terry Drill Co. The second by the Cleveland Rock Drill Co., which type represents the most advanced design of any stoper, has a throttle-valve so arranged that in soft ground the rotation can be made rapid, but the hammer-stroke light, while in hard ground, hard hitting can be obtained with any desired speed in rotation; that is, the rotation and the drilling hammer can be operated separately and at different speeds. Despite, however, this desirability of control and flexibility, such a type of stoper weights much more than a hand-rotated stoper of the ordinary sort. Automatic rotation of stopers is an advantage when the hole is somewhat flat and the cuttings, not falling out readily, bind the steel in the hole. It is easier for the miner. It is not unlikely that a stoper style of drill may establish itself for driving, using water and air to clean the hole, and differing from the Leyner essentially only in having air-pressure feed instead of hand cranking. The first automatically rotated plugger to score any considerable success was the Jackhamer of Ingersoll-Rand, although the honour of putting the first machine on the market probably goes to the McKiernan-Terry Drill Co. The Cleveland 'Mucker' possesses the same separate engine and valve as the Cleveland stoper. The Ingersoll-Rand 'Bull Moose' is seemingly much like the 'Mucker' in construction. The quality of the drill-steel has not kept up to the progress in drills; particularly does drill-steel show up weak with hammer-drills. In a deep mine, it is calculated that every round-trip to the sharpening shop for each piece of steel costs 10 to 15 cents. There is some promise in a detachable bit invented in Butte, such that a miner can carry bits for a working-shift in his pocket. What constitutes a good drill? (1) Speed, because miners are highly paid workmen. (2) Standing-up to the work. (3) Lightness and convenience, because much depends on the miner liking his machine. (4) Low air consumption, not of so much account as the first three, because speed, etc., is more important than a little wasted air. The air-drill is an inefficient and extravagant machine at best. It uses an expensive fluid at full stroke; a 3½in. piston machine requires when running probably 25 h.p. to be taken off the motor-shaft of, say, a belt-driven compressor."

Employment in Johannesburg.

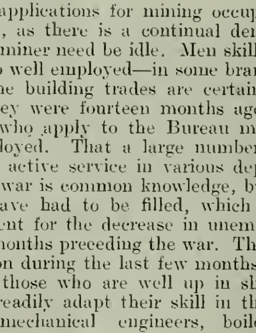
In Johannesburg it is reported by the Labour Department that unemployment is doubtless more prevalent than the registrations indicate, but the applications for work are exactly the same as the number who applied in July, 1914—the month before the war broke out in Europe—and in June, 1914, the applications were 425. In five of the leading occupations applications were as under:—

	June, 1914.	Sept., 1915.
Mining	17	23
Engineering	51	42
Building	73	41
Clerical	25	10
Unskilled	210	51
	376	167

At present the applications for mining occupations are not made by miners, as there is a continual demand for them and not a single miner need be idle. Men skilled in engineering work are also well employed—in some branches workmen are scarce. The building trades are certainly in a better position than they were fourteen months ago, and the unskilled workers who apply to the Bureau most readily are also better employed. That a large number of men have gone oversea on active service in various departments connected with the war is common knowledge, but many of the posts vacated have had to be filled, which accounts to a considerable extent for the decrease in unemployment compared with the months preceding the war. The skilled labour leaving the Union during the last few months has been confined chiefly to those who are well up in shipbuilding and those who can readily adapt their skill in the manufacture of munitions, mechanical engineers, boilermakers, and others employed in the metal working trades. To this extent unemployment has been relieved in these occupations, drawn chiefly from employees on the railways, mines, and engineering shops throughout the Union.

"SKEFKO"

BALL BEARINGS.



'Phone 835. Johannesburg. Box 654.

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CONTENTS.

PAGE
Notes and News ... 193
Topics of the Week:
Rooiberg and Zaaiplaats ... 195
Sidelights on Technical Education ... 196
Patent Law Reform ... 196
The Year with the Zaaiplaats Tin Mining Company ... 197
Mining Prospects of the Murchison Range District—II. 198
Auriferous Antimonial Ores ... 199
Yield, Costs and Profits in September ... 200
The Buying and Selling of Ores—I. ... 200
Rhodesian Section:
September Returns ... 201
The Comparative Costs of Compressed Air and Electricity for Use in Mine Stope Haulages ... 202
The Water Supply on the Rand—XII. ... 203
Correspondence and Discussion: "What is 'Adequate' Mine Ventilation?" ... 204
The Week in the Sharemarket ... 205
The Year with the Knights Deep ... 206
Mine Safety, Sanitation and Welfare Bulletin:
Recent Accidents and Their Lessons ... 207
Gassing Accidents ... 207
Mining and Metallurgy at the San Francisco Exposition—I. ... 208
The Week in the Mining Material and Engineering Trades ... 209
Company Meetings: Rooiberg Minerals ... 211
Engineering Notes and News:
Uses for Worn Tube Mill Liner Bars ... 214
Irrigation Work ... 214

Notes and News.

Scheelite.

Some excellent samples of scheelite have arrived in town from the neighbourhood of the Murchison Range. The Government Inspector of Mines, Mr. Trevor, is said to have examined the proposition, and to have a favourable opinion of its prospects. The price of scheelite, as fixed by the British Government, who are buying supplies through Messrs. Watson & Co., of Liverpool, is 55s. per unit of 60 per cent. WO_3. The price of this ore has been rising for several years past, owing to the demand for it for steel hardening purposes, and there is no doubt that the Government did a wise thing for itself, if not for producers, in taking steps to limit the advance after the war.

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Molybdenite.

Various molybdenite propositions have been submitted locally since the war created a special demand for this ore, but it does not appear that any of them have proved satisfactory. With molybdenite, as with other rare ores, the difficulty of ensuring a sufficient supply is the chief obstacle to doing business. There are numerous occurrences in the Transvaal tin area which have been known for some years past, but in none of them; as far as we are aware, does the ore occur under sufficiently promising conditions. It is said that some deposits in the old granite in the Low Country are being quietly investigated by a Rand house, but the information available is extremely scanty.

* * * *

The Gold Industry and the War.

We have to thank Sir Southern Holland, the British Trade Commissioner in South Africa, for a timely and striking tribute to the importance of the Rand. The gold industry has been the salvation of the Union of South Africa at this critical period of its history," says the British Trade Commissioner for South Africa in his annual report issued in London this week. The effect of the war, he proceeds, at the outset caused considerable depression. Then came a marked change showing a return of confidence on the part of merchants and others. The Commissioner emphasises that it would have been easier to maintain South Africa's trade but for the local unrest. The capture of German trade has proved more than a mere phrase. It has been the ideal of British firms, but he advocates still further alertness. He points out the notable efforts of American and Canadian firms and impresses upon British manufacturers the necessity of meeting the special requirements of the South African markets. The commissioner concludes by dwelling on the great capacities of meat export. He says if South Africa avoids overstocking, the careless investment of capital, and too heavy immediate borrowing, there is room only for optimism. All of which, of course, we heartily endorse.

* * * *

Retirement of Popular Mine Inspector.

From the end of the current month Mr. William Moses retires from the Mines Department, after fifteen years' service. Mr. Moses joined Lord Milner's staff in 1900 as Inspector of Mines for the Transvaal. From his record in "Who's Who," we take the following:—Moses, William, J.P.; M.I.M. & M.E.; Mining Engnr.; Inspector of Mines, Transvaal; b. 28th April, 1854, at Newcastle-on-Tyne, Engd.; s. of John Moses. Educ. Royal School, Newcastle; College of Physical Science, Durham University. Served apprenticeship as Mining Engineer at Earl Durham's Collieries. Asst. Man. at Marquis of Londonderry's Collieries; Manager at Sir Charles Palmer's Collieries; Manager of Chatton, Barmoor & Doddington Collieries, Northumberland; Mining Engineer to the Chinese Govt., North China. Came to S.A. in 1891. Manager of the Kimberley Mine, De Beers Consolidated Mines, Kimberley. Came to Transvaal, 1897; General Manager Transvaal Coal Co., Transvaal; subsequently appointed Inspector of Mines, Transvaal. In his fifteen years' connection with the Department, Mr. Moses has figured in all the local mining *causes celebres;* and has thus gained a unique experience of current mining controversial questions, and his efforts have always been directed to aid his mine manager friends in the struggle for safety, efficiency and economy. Needless to say, his retirement will be regretted by the whole body of mine managers on the Reef, who have always found in him a friend and sympathetic co-worker. Though beyond the age limit for Government service, we are glad to learn that Mr. Moses is not putting off his harness but intends starting practice in Johannesburg as an independent consulting engineer.

* * * *

The Position of the Nigel.

The secretary of the Nigel writes:—In connection with the manager's recommendation to suspend milling operations for six months for the purpose of pushing development and saving loss, the following cablegram has been sent to London: "Technical advisers report issue depends entirely upon continuance and payability large shoot lately exposed eleventh drive east three shaft. (They) Recommend pushing by double shift fourteenth and twenty-second drives to prove shoot in depth. If shoot continues (the) drives mentioned should be well into it in about two months when position mine will be reconsidered in light information gained. Meantime milling be continued on reduced tonnage (of) highest grade expenses reduced for purpose try make ends meet. Board approves. Operations being carried on accordingly."

* * * *

Union Finances.

Last week's Union *Gazette* contains the customary monthly statement giving in detail the returns of Union revenue for the month and six months ending September 30th. We have already shown, on the basis of the summarised returns published three weeks ago, that there is every reason for the Minister of Finance to expect a yield from the various revenue sources substantially in excess of his estimate. This is on the assumption that the revenue is maintained for the second half of the year at the level of the past six months. The income from Customs has exceeded the estimate by practically £100,000, and, owing to the new duties, is nearly £200,000 better than the yield for the corresponding period of last year. Excise revenue is falling rather short of the estimate, but the Postal services have produced some £50,000 in excess of the official forecast. Native taxation has fully realised expectations, and it is remarkable to notice that stamp duties are likely by the end of the year to exceed the estimated yield by £100,000. On the whole, it is not unreasonable to look for a total revenue at the end of the year some £700,000 in excess of the estimate, provided that there is no sudden slump in trade.

* * * *

East Rand Mining.

At the annual meeting of the East Rand Mining Estates in mail week, Mr. F. C. Rowsell, the chairman, made some interesting statements. Having pointed out the importance to all Rand undertakings of developments in neighbouring properties, he proceeded to give details. The Geduld, for instance, at the end of last year had developed 1,900,000 tons of ore of the average value of 30s. 2d. over 59½ in., and the profit for the year's crushing amounted to 7s. 11d. per ton; while the Springs Mines at the same date had developed 553,000 tons, of the value of 43s. 9d. over 52 in. Both these mines are contiguous to the East Rand Mining areas, and in view of the results obtained shareholders will no doubt fervently echo the hope that before the next annual meeting the war will be at an end and that "we shall enter upon a time of financial activity, rendering it possible to undertake the raising of the necessary capital for the development and equipment of the great properties in which you are interested."

* * * *

The Mine Dust Question.

Discussing Dr. Moir's valuable paper on dust and miners' phthisis, before the Chemical and Metallurgical Society, Mr. H. R. Adam remarks that Dr. Moir's results show that "wetting" is effective when actually performed in the hole, *i.e.*, that the "very fine" dust can then only emerge in the form of slime. It is, however, well known that the dust caused by drilling is insignificant compared with that caused by blasting, and the only results given on samples taken after blasting deal with the air after blasting the "cut" with and without "best water blast." On the matter of the air in stopes, say three or four hours after blasting, when tramming commences, not a single result is given. In fact, admitting that the investigation shows that the dust from drilling and development can be dealt with, it does not touch the much bigger and more difficult question of the air in stopes, and in these circumstances the statement made in italics that "when the laying devices were in order and conscientiously used, the result was satisfactory" is extremely misleading. Since no details of the effects of different types of "laying devices" are given, discussion on this point (says Mr. Adam) does not apply to the paper. However, since the "laying" of the "very fine" dust depends on the "wetting" of the particles, the question may be asked whether the committee has any data on the effect of additions, such as sugar (in the form of molasses), soap, alkalies, etc., to the water in order to increase its "wetting" power. Under the paragraph referring to the rate of falling of quartz particles, the statement is made that the smallest particles formed in dry-drilling and by blasting cannot possibly settle in the eddying atmosphere of the mines. The trouble is that most mines have many spaces, such as back stopes, old stopes, dead ends, etc., where the only eddying currents that are formed are due to blasting, and then "very fine" dust which had settled is disturbed again.

* * * *

A Rhodesian Mining Lawsuit.

According to Reuter, the walls of the Chancery Court were covered with plans of gold mines this week, while an iron cage electrically lit showed the levels of a gold reef in the case of the Amalgamated Properties of Rhodesia against the Globe and Phoenix Mining Company. Counsel said gold worth £400,000 was involved in the action. The plaintiffs claim that under an agreement they sold to the defendants 10 gold mine claims known as the "John Bull Block" for £1,000 cash and a half share of any gold found. The defendants allege that the plaintiffs were not the owners of the block at the date of the agreement, but merely possessed the right of "extra lateral pursuit" of the reef. Consequently the defendants allege that the gold found in the reef running down obliquely under the plaintiffs' claims belongs to the defendants. The case, fortunately for the Rand, possess merely an academic interest here, as our Gold Law contains no such terror as the extra lateral right.

* * * *

Dr. Moir's Paper.

In discussing the paper by Dr. Moir on dust and phthisis, read before the Chemical, Metallurgical and Mining Society, Mr. F. J. Pooler remarks that it is fairly obvious that despite the efforts made—and we are all agreed that progress has been made—things are still very bad in some of the mines. Why should the CO be so high in odd cases? How is it that the water-blast "was sometimes out of action or too small to be of use"? The Government Inspectors cannot be everywhere at once, and surely now that the peril of the thing is a by-word here, we of the public who are outside the mining industry ought to feel assured that the Government insists on every possible precaution being taken and sees to it that these are carried out in the mines. It seems that the fact that miners' phthisis has become a plaything in the baneful cockpit of party politics has a lot to do with the fact that researches such as these, necessary, valuable and imperative as they are, are only now being undertaken, and are revealing dangers hitherto only hinted at, dangers that should have been abolished years ago. When the subject was being discussed by the Chemical and Metallurgical Society some three years ago, remarks Mr. Pooler, a medical member of the society made the statement that men in the mines' crusher-houses and on the municipal road-stone crusher-plants were also contracting the disease. It was comforting to read that Dr. Moir states that the former, at any rate, are comparatively immune. The research work of Dr. Moir's paper showed that a considerable and notable advance had been made in experimental determination of dust, but apparently much had to be done in the mines yet before the dust evil was overcome. Suggestions as to further advance in this, the all-important direction, did not fall within the scope of this paper; but those of them who were among the author's admirers looked confidently to him and the engineers, among whom were some of the most active members of the society, for a speedy and permanent improvement of the conditions.

* * * *

The New Metallurgy. Mr. Charles Butters has been interviewed by the *Mining and Scientific Press* on the flotation process, which he says "has started a new era in the concentration of ores." The information given by him concerning flotation is timely. The experiments made by him at his laboratory at Berkeley are all done with alkaline solutions. This in itself is noteworthy, for the use of acid has been a prominent feature of earlier flotation processes, because the acid accentuated the selective adhesiveness of oil for metallic particles as compared with the earthy gangue-minerals. But the most interesting information given in the interview is that dealing with the flotation concentrate. So far, at the lead-zinc mines of Broken Hill and at the big American copper mines using the process, the question of treating the concentrate itself has been shelved, for a ready market was furnished by the smelters. In many isolated localities, in Mexico or the West, the reduction of the concentrate on the spot is advisable, if not imperative. As to this, Mr. Butters makes some suggestions. His frank acknowledgment of lack of knowledge concerning certain phases of the process is instructive, says our contemporary. "As a matter of fact, the technology of flotation thus far has been mainly developed in the wake of a peculiarly vindictive litigation. The Law is not a good teacher of science. Indeed, of the literature of the subject to date it can be said that nine-tenths of it is hopelessly vitiated by the prejudices of patentees, process-mongers, and litigants. Most of the men experienced in the flotation process are either tied to the company claiming a monopoly in the use of it, or they are in the employ of the companies that are contesting that monopoly. In consequence, the amount of reliable information available is small. The metallurgists who have been largely instrumental in developing the agitation-froth process are under orders not to write or talk, for fear that they may hurt the cause of their employers in law-suits now pending, and that have always been pending since flotation—whether by oil, gas, or froth—first became of any consequence. On the other hand, the metallurgists and millmen associated with those who are confessedly infringing the disputed patents are in no position to give the profession the benefit of their experience with such frankness as they—and we—would desire."

* * * *

The Income Tax Collections. The collection of the Income Tax for the year ended June 30, 1915, has now begun, and it may be useful to note some of the new features. First, the Income Tax Act No. 23 of 1915 is to be read in connection with Act No. 28 of 1914, the previous Income Tax Act. This Act of 1914 exempted incomes from taxation up to £1,000 per annum, but after that figure it imposed a tax of 6d., plus 1-2,000th of a penny, for every £1 up to £2,400, on which the tax was, of course, 1/6. Now the new Act of 1915 exempts incomes of £300 instead of £1,000, and where the income does not exceed £500 certain further deductions are also allowed—such as life, accident, or sickness insurance premiums on self or wife up to £25, fees to friendly societies not exceeding £10, sick benefits received. For the arithmetical convenience of those who desire to see at a glance what their obligation is, the following table is given:—

Incomes.	Tax.			Incomes.	Tax.		
£	£	s.	d.	£	£	s.	d.
300 and under	Nil.			900	30	15	0
301	0	1	0	1,000	36	0	5
400	5	0	5	1,200	46	13	9
500	10	1	8	1,500	63	0	0
501	10	2	8	2,000	91	0	5
600	15	3	9	3,000	150	3	9
601	15	4	9	5,000	281	0	0
700	20	6	8	10,000	681	0	0
701	20	7	8	20,000	1,793	10	5
800	25	10	5	25,000	2,500	0	0
801	25	11	6	50,000	5,000	0	0

The tax may be paid in instalments.

TOPICS OF THE WEEK.

ROOIBERG AND ZAAIPLAATS.

The week has produced an interesting annual report from the Zaaiplaats Company, and a comprehensive review of the Rooiberg position from the Chairman at the annual meeting. An important problem in connection with the recovery of tin concentrates is presenting itself at the Rooiberg, as it has done long since at other tin mines in various parts of the world, and particularly at those of Cornwall. According to the statement of the Chairman at the annual meeting, "experience has shown that as the mine increases in depth the tin contained in the ore is finer, especially in the Union Lode, which is the present principal source of production, and there is a higher percentage of pyrites; this fact increases the difficulty of extraction, and the existing slimes plant is unable to recover some of the fine tin." As a result of this position of things it has been found necessary to provide a further increase of plant to treat the slimes. As Mr. E. J. Way explains in his report as consulting engineer, the final tailing has an average value of about 0.57 per cent. metallic tin, and of this at least 40 per cent. is a —200 product, and contains metallic tin of the value of from 1.0 to 1.4 per cent. In other words, 11.4 lbs. of metallic tin per short ton are escaping in the form of slime tin, equivalent in value, at £150 per ton, to 17s. per ton milled. It is obvious that the company is well justified in its determination to save some of this, even if considerable capital expenditure is involved in the undertaking.

In the Zaaiplaats' report are several interesting points regarding working costs, extraction and development. Despite the successful introduction of chloride roasting, much trouble was experienced with impurities which fouled the ore during the latter months of the year. The existing roasting plant is barely capable of dealing with these impurities. No expensive additions were considered, however, pending the receipt of the result of tests being made in London with the oil flotation process. There is every reason to expect these tests to be completely successful and thereby do away with the expensive roasting treatment. In the meantime experiments are being conducted at the mine with most encouraging results. It is now fully established that good classification is the most important factor in the achievement of high extraction. The classification of ore particles coarser than 200 mesh has always been a simple matter and on this material a very high extraction is made. Below 200 mesh grade, however, the pulp ceases to be amenable to existing methods of classification, with the result that attention has been devoted almost exclusively to the improvement of fine concentrating devices. Attempts in this direction have not met with any considerable measure of success and it is, therefore, with keen interest that the performance of a centrifugal separator recently introduced is awaited. If successful, the separator will revolutionize the treatment of slime. One of the new machines is now on order. Turning to a general survey of the year's work, the manager shows that although the total working cost is lower than in the previous year, the cost per ton treated is greater. This is due to the smaller tonnage dealt with during the period operations were partially suspended, and to the increase in realisation charges on account of additional expenditure in freight, insurance, etc., caused through the war. The outstanding feature of the returns is the reduction in the milling cost from 7s. 11·4d. to 6s. 10·6d. per ton treated. The reduction, which was foreshadowed last year, is entirely due to the economies effected by single shift crushing and would have been greater in a normal year. The working revenue shows a decrease, compared with the previous year, of 3s. per ton treated, and is accounted for chiefly by the lower market price realised for the company's outputs during the year under review. From all this it would appear that the decline during the past few days in the quotation for the shares of the company is not due to anything appearing in the annual report, which, on the whole, may be described as distinctly satisfactory.

SIDELIGHTS ON TECHNICAL EDUCATION

The first report of the governing body of the Johannesburg Trades' School throws some instructive sidelights on the progress of technical education in this country. It would appear that from statistics collected in connection with the various trades it has been clearly shown that both in the case of the mines and private firms the great majority of the skilled artisans have come from oversea, and in certain trades the ratio of apprentices to journeymen is exceedingly low. There is an increasing tendency evident to recruit from the youth of this country who, by becoming skilled craftsmen are elevated beyond the competition of native races. There are thus increasing prospects of employment for South African trained youths and the governing body looks forward with increased confidence to the utility of the school. Another interesting point in the report is that the electrical and mechanics shops have hitherto absorbed a majority of pupils on the completion of their probationary period, with a natural result that difficulty is experienced in pupils from these shops obtaining satisfactory employment at the conclusion of their school course, while from the other shops it has not been possible to fill the vacancies notified to the school. The situation in this respect became so pronounced during the year that the governing body appointed a committee to deal with the matter. After interviewing the pupils concerned a circular letter was addressed to each parent, pointing out the overcrowded condition of the electricians and mechanics trades, and drawing attention to the possibilities of other avenues of employment. As a result of the committee's action only four pupils decided to transfer. "There is no doubt," says the report, "the loose use of the term 'engineer' is partly responsible for this state of affairs, and the governing body would again point out, as all connected with the school have repeatedly done, that a fitter, turner or electrician is no more an 'engineer' than a joiner or bricklayer is an architect. The neglect of the four trades mentioned is difficult to understand, though this is the common experience of the mines and other employes of labour, as well as of the school, as it would appear that first-class tradesmen in blacksmithing, joinery, carriage building and plumbing are in demand and are reasonably certain of continuous employment. The possibility which these trades offer for a skilled craftsman to establish his own business on such capital as he may reasonably hope to command as the result of his own thrift, is an advantage which appears to be overlooked in the choice of a life calling." The report goes on to point out that for some time past it has been apparent that the future success of the school imperatively demands the granting of wider powers to the governing body. As at present constituted the governing body has only power to make recommendations, without any means of ensuring their performance; matters of urgency are practically outside the cognizance of the governing body owing to the inevitable delays of the present system which frequently neutralize any efforts on the governing body's part; important matters are only too frequently subjected to such protracted delay from one reason or another, and are then carried out in such modified form as to render the governing body's expenditure of time and energy totally incommensurate with the results obtained. During the latter half of their first year of office the governing body arranged a series of visits to the school for the different technical societies and associations of masters of the different trades practised. The South Arfrican Institute of Engineers, the Institute of Electrical Engineers, the Association of Certificated Engineers, the Chemical, Mining and Metallurgical Society and others, in turn inspecting the building and the work being done. While the visitors were generally satisfied with the methods of conducting the work, many minor alterations resulting from kindly criticisms undoubtedly gave an added value to the courses.

PATENT LAW REFORM.

The full report of Dr. Hele-Shaw's address before the Engineering Section of the British Association is now to hand, and has much of interest to inventors and engineers in South Africa. Reference was made to the address in these columns some weeks ago, but there are other points in it that may usefully be noted. The question of the amendment of the British Patent Law is one that crops up periodically, and various suggestions are made for its improvement. Some of the suggestions that are made from time to time are well worthy of consideration, but others, when looked into, only show that they are put forward by interested parties as a panacea for ills which they themselves have suffered, and which may not be suffered by others. Progress in engineering, certainly on the mechanical and electrical sides, is largely dependent upon invention, and invention will not progress, nor will it be seriously undertaken, unless proper and adequate protection be given to the inventor, and to those who really make invention practical by means of capital and business support. Dr. Hele-Shaw does not suggest that the whole of the patent laws of the world should be treated as has been suggested, but thinks it would be a splendid thing to bring about a conference leading to the unification of the patent laws of the British Empire, and to have one comprehensive patent law for the whole of the Empire. In the past, and even at the present moment, there has been, and there is, a gradual bringing into line of the patent laws of the British Colonies with that of the Mother Country. Australia, since the formation of the Commonwealth, has promulgated a law which covers the whole of that continent and Tasmania, and an inventor has, therefore, only one patent to take out to protect his invention instead of six patents as formerly. The Australian law is in many respects a copy of that now in force in the Mother Country. Of course, there are differences, but these are slight, and the practice followed is based on that of the British Patent Office. The Government of the Union of South Africa has not yet had time to pass a patent law to cover the whole of this area, so that an inventor is bound to take up about five patents to protect himself. There is no reason why one law should not be passed for the whole of the Union, and we hope that such a law will soon be placed upon the Statute Book. India has recently had a new law, which has brought Indian patent law and practice more up to date and akin to British law and practice. Other British Colonies have patent laws, and these laws are from time to time amended. *Engineering* points out that a very good step has been made in the right direction in certain of the British Colonies and Protectorates, which now grant protection for an invention patented in Great Britain by the mere registration in the Colony of the British patent. This procedure is simple, and it does not involve the Colony in much expenditure for a staff to work the patent law. It is not to be expected that the smaller Colonies can afford to put into operation a law similar to that in Great Britain, and institute in each Colony an official examination as to novelty. The number of patent applications in some of the Colonies is so small that the Patent Office of that Colony could not possibly be made to pay if such procedure were adopted. It must not be forgotten, when considering the question of bringing the several Colonial patent laws into line, that the Patent Office in England and the Colonies is regarded as a revenue-producing office.

Stock Exchange Values.

Between August 21 and September 21 the value of the 387 representative securities whose fortunes are followed closely by the *Bankers' Magazine* showed a depreciation of £1,059,000, or 0·04 per cent. The values are arrived at from the markings of business done, and it is pointed out that "scarcely a month goes by but what some stocks which had been almost obsolete since the war become more saleable, but at a greatly reduced value." Groups which showed appreciation were Home Corporations, Colonial Railways (2·7 per cent. up), American Rails, Foreign Rails, Colonial Banks, Breweries (7·3 per cent. better), Shipping (3·8 per cent. higher), Telegraphs, South African Mines, and Copper shares.

THE YEAR WITH THE ZAAIPLAATS TIN MINING CO.

Net Profit £24,631—Directors' and Manager's Reports—Working Costs and the Extraction Question.

The directors' report for the year ended 31st July, 1915, to be submitted at the seventh ordinary general meeting of shareholders, to be held in the company's offices, Norwich Buildings, Church Square, Pretoria, on Monday, the 6th December, 1915, states: The following is a summarised statement of the year's operations at Zaaiplaats Tin Mine: Mill of 15 stamps ran (12 hours basis) 269 days; ore mined, 25,937 short tons; ore drawn from surface dumps, 1,621 short tons; waste sorted out (24.5 per cent.), 6,281 short tons; ore milled, 21,277 short tons; residues treated, 9,581 short tons; alluvium treated, 29,778 short tons; concentrates produced, 699 long tons; average grade of concentrates produced, 70.4 per cent. M.T. The quantity of concentrates produced is about 500 tons less than the quantity produced during the previous year. This is chiefly due to the partial cessation of crushing operations from the beginning of August for a period of about four months, owing to the outbreak of war, and the dislocation of work caused through the Rebellion. Advantage was taken during the above period to carry out certain necessary repairs to the crushing and milling plant. The revenue from tin concentrates won amounted to £73,075 14s. 5d., while the expenditure on working account amounted to £42,935 15s. 10d. The working profit for the year was, therefore, £30,139 18s. 7d. In addition to the foregoing revenue, a sum of £360 2s. 11d. was derived from interest, rents, etc., while the following additional expenditure has been incurred: Income tax for year ended 31st July, 1915, £1,489 10s.; Government Royalty on profits, £2,179 17s.; directors' remuneration, £1,375 7s.; bonus to men on active service, £321 0s. 7d.; prospecting and exploration work, £502 7s.; total, £5,868 1s. 7d. The net profit for the year was, therefore, £24,631 19s. 11d., which together with £11,652 4s. 7d. brought forward from the previous year, and an amount of £3 4s. 6d. recovered for plant sold in excess of expenditure on capital account, has been dealt with as follows:—Auditors' fees for year ended 31st July, 1914, £157 10s.; dividend No. 16, £21,000; income tax for year ended 31st July, 1914, £3,213 3s.; amount carried forward, £11,916 16s.; total, £36,287 9s. An amount of £1,000 was appropriated from the reserve fund, for the purpose of carrying out certain prospecting and exploration work. The reserve fund, therefore, now stands at £6,000. The average price realised for the company's output during the year was £165 18s. 3d. per ton of metal, as compared with an average of £168 for the previous year. Practically no capital expenditure has been incurred during the year. The water supply has been ample for the company's requirements, and no shortage is anticipated before the rainy season sets in. During the year the directors declared interim dividend No. 16 of 35 per cent., equal to 1s. 9d. per share. The total amount paid to shareholders since the inception of the company amounts to £339,000, equivalent to 565 per cent. on the capital.

The manager, Mr. A. Gilbertson, writes as follows *inter alia*:—

I beg to submit herewith my report for the year ended 31st July, 1915. From August, 1914, to January, 1915, milling operations were partially suspended, and work underground was confined to the most important sections. *Mining.*—No. 13 Section: The most noteworthy feature of the year's work in No. 13 Section was the temporary weakening of the main ore body. The impoverishment, though less severe than on previous occasions in the life of the working, came at a time when the rest of the mine was incapable of making up the deficiency in production. The circumstance, therefore, made itself felt in a greater degree. The ore body recovered its usual strength, and has since given no cause for anxiety. The proximity of a felsite dyke gave rise to some speculation as to what changes might be expected at the point of contact with the ore body. The dyke was encountered at the close of the year, and, whilst the dyke is apparently associated in some way with the deposition of ore, it is satisfactory to note that no change in productiveness has taken place. Early in the year a branch body, "A," came into prominence and continued productive to within a few feet of the surface. "C" branch, discovered in May, is a strong low grade body similar to "A" and is expected to improve. Other Sections: There has been a gradual decline in productivity of other sections. Nos. 5 and 6 Sections, as heretofore, yielded a substantial quantity of ore, but the continued drain, in the absence of fresh discoveries of a permanent nature, has made itself felt, and no great assistance can be expected from this quarter for the time being. Developments in No. 6 main face were not promising. For these reasons it will be a matter of difficulty to maintain the output on the level of previous years, and a somewhat reduced output must be expected unless fresh discoveries are made or a large increase in the size and value of No. 13 ore body takes place. *Exploration and Prospecting.*—27.5 tons of concentrate were recovered from 29,778 tons of alluvium treated in No. 4 alluvial plant. No fresh discoveries were made on the surface exposed by the removal of overburden. All alluvial work was concentrated at No. 4 plant for the purpose of obtaining greater efficiency. The early success of these plants has been fully maintained, and a profit is being made on the treatment of alluvium, notwithstanding the fact that prospecting is the main purpose in view. *Tonnage Statement.*—Tons mined during the year, 25,937 short tons; waste sorted (24.5%), 6,281 short tons; sent to mill, 21,277 short tons; less taken from reserve dumps, 1,621 short tons—25,937 short tons. *Ore Reserves.*—Payable ore at grass, 14,731 short tons; payable residues available for treatment, 30,454 short tons; total, 45,185 short tons. The returns from the treatment of residues have not come up to expectations. With the exception of slime, which ranges from 0.75 per cent. to 1.25 per cent. metallic tin, the residues treated to date have not averaged more than 0.5 per cent. metallic tin. It is probable that higher values will be obtained in the heart of the dump which has not yet been reached, but after making allowance for this the returns cannot be expected to realise the original estimates. The treatment costs are, however, very low, about 2s. per ton, and a substantial profit is made. The grade of current ore was slightly higher than in the previous year owing to the larger proportion of ore obtained from No. 13 Section. Despite the successful introduction of chloride roasting, much trouble was experienced with impurities which fouled the ore during the latter months of the year. The existing roasting plant is barely capable of dealing with these impurities. No expensive additions were considered, however, pending the receipt of the result of tests being made in London with the Oil Flotation process. There is every reason to expect these tests to be completely successful, and thereby enable us to abandon the expensive roasting treatment. In the meantime experiments are being conducted at the mine with most encouraging results. The extraction cannot be definitely stated owing to the incompleteness of the returns during the rebellion period. The plant was kept at a high state of efficiency, however, and there is no doubt the former years' figures were reached. It is now fully established that good classification is the most important factor in the achievement of high extraction. The classification of ore particles coarser than 200 mesh has always been a simple matter, and on this material a very high extraction is made. Below 200 mesh grade, however, the pulp ceases to be amenable to existing methods of classification, with the result that attention has been devoted almost exclusively to the improvement of fine concentrating devices. Attempts in this direction have not met with any considerable measure of success, and it is, therefore, with keen interest that the performance of a centrifugal separator recently introduced is awaited. If successful, the separator will revolutionise the treatment of slime. One of the new machines is now on order for this company. *Working Costs, Revenue and Profit.*—The following were the working costs, revenue and profit for the period under review:

	Cost Per Ton treated, 1913-14.		Total Cost, 1914-15.	Cost Per Ton treated, 1914-15.	
	s.	d.		s.	d.
Mining … … … … … … … …	9	9.6	£16,123 10 3	10	5.4
Sorting and Tramming … … …	0	11.2	1,568 3 7	1	0.2
Milling and Concentrating … …	7	11.4	10,627 15 7	6	10.6
Drying and Bagging … … …	0	5.0	1,015 14 4	0	7.9
Realisation Charges … … … …	1	0.2	4,725 15 8	3	0.7
Mine General Charges … … …	2	5.5	4,764 9 8	3	1.0
Head and London Office Expenses	0	11.2	2,094 16 10	1	4.3
	23	6.1	40,920 5 11	26	6.1
Prospecting—Alluvial Treatment	2	2.6	2,015 9 11	1	4.2
	25	8.7	42,935 15 10	27	10.3
Working Profit … … … … …	24	8.0	30,139 18 7	19	6.3
Working Revenue … … … …	50	4.7	£73,075 14 5	47	4.6

MINING PROSPECTS OF THE MURCHISON RANGE DISTRICT—II

Glowing Reports of Early Days—The H.E. Proprietary and Others—Woodbush and Hænertsburg.

As far back as 1895 the Johannesburg correspondent of a London paper wrote as follows:—"For some years past the only fashionable gold field in South Africa was the Rand, and judging from results, justly so, too; but now that the best ground in this particular district is already taken up, the investor is casting longing glances around in search of a new Eldorado where he can invest some of the vast amount of money lying idle in different parts of the world. Evidently the time has come for other gold fields in South Africa having their turn—such, for instance, as the De Kaap, Lydenburg, Murchison Range, and Matabeleland, all of which are beginning to share public attention." The Rand has, nevertheless, contrived to maintain the public interest which it possessed at that time, and although Barberton, Lydenburg and Rhodesia have contributed a considerable quantity of gold to the world's supply, they have continued to be looked upon as "outside districts" of comparatively small importance. Since those earlier days industrial and living conditions have been greatly improved, and districts which were then overshadowed by a field of unique character, with abundant promise of a brilliant future, are now beginning to reassert themselves when official reports of the most authoritative kind do not hesitate to warn the Government and the public of its approaching decay. Lydenburg, for instance, whose light has been kept under a bushel, so to say, these many years past, is not merely emerging from the darkness; it is thrusting itself into the daylight in a way that can no longer be resisted. Engineers and mining employees of various grades whose vision has hitherto been bound by the horizon of the Rand, and has seen nothing worth troubling about outside it, are now putting their little capital and savings into the so-called "small man" propositions of the district with the hope of abundant reward. The Nelspruit-Graskop line of railway has helped to the better appreciation of a district which has been merely "scratched" by the extremely profitable workings of the Transvaal Gold Mining Estates and other claim holders. The Komatipoort-Zoekmakaar railway has brought the same line of country to the north within the range of economic operations, and although there is not the same amount of evidence in support of the value of the more distant goldfield, there are still unquestionable possibilities which warrant exploratory work upon a liberal scale.

Murchison Range Reefs.

A notable feature of the quartz ore-bodies, or reefs, along the Murchison Range is their fairly persistent character as regards values. That is to say, their auriferous character is maintained over many miles; sufficiently so to justify careful investigation. Whether the values are consistent enough, in face of the lenticular habit of the quartz bodies and the erratic distribution of the gold contents, to warrant the erection of many small milling plants, is a point which has yet to be decided. In a paper upon the Economic Importance of the Murchison Range," written by Mr. C. Wilson-Moore in 1896, the author stated that he knew of at least ten miles of payable ground along the line. "Assuming the average width of the auriferous quartz reefs at two feet," he said, "and their workable depth at 1,000, they arrive at a total tonnage of 7,500,000. If that ore was worth, on an average, 15 dwts., or £2 15s. per ton, they arrived at a grand total of value for each 1,000 feet in depth over the ground already proved of £20,625,000. That in itself was no inconsiderable figure to leave lying idle in the ground, more especially when that value was not in the isolated patches over miles of country, but was contained in one well-defined zone, the exact cost of which was known and proved. But the value of the antimony did not cease there. The tonnage contained over the known line of auriferous antimony was certainly twice as much as that estimated for the quartz reefs, and they found that they had no less a sum than £150,000,000 worth of auriferous stibnite lying practically untouched and unworked in the Murchison Range. That was, of course, an amount far in advance of the world's requirements, but he held to the belief that the stibnite would be worked for its gold alone, and there was, from present indications, every reason to believe that the value of its contained gold could not be less than £20,000,000. As for alluvial gold, the denudation from the Ranges must have been enormous, and millions of ounces must be lying in the dry valleys." This way of talking in millions was not uncommon in those days, even amongst engineers who would almost hesitate to speak of thousands in the same way to-day, unless there were actual tangible data to support their figures, and Mr. Wilson-Moore was admittedly making assumptions, but his remarks go to show that sampling and assays along the Murchison must have been fairly promising over long distances. His opinion that the line would be worked for gold alone and not for antimony appears likely to be falsified if the work at the United Jack and Weigel Mines turn out to be profitable.

Four lines of reef were recognised in those days, viz., the Antimony Reef, Black Reef, Melatie Reef, and the Sutherland Reef, and it was said that the identity of these reefs had been proved with certainty along some fifteen miles of the gold belt. However that may be, some thousands of claims were pegged for a much greater distance than that. In a prospectus of The Transvaal Murchison Consolidated Gold Fields, which lies before us, a map is contained which shows the position of 1,041 claims which it was proposed that the company should acquire, covering a continuous distance altogether of nearly 25 miles. The fact that the reefs dip nearly vertically made it unnecessary to peg off deep level blocks, so that four rows of claims was the greatest width marked off at any point along the line taken up. The nominal capital of the company was to be £400,000 in £1 shares, of which 100,000 shares were to be subscribed at par, 110,000 shares were to be held in reserve, and 190,000 shares were to go to the vendors. An active policy of development was to be undertaken with the object of floating subsidiary companies from time to time. The main line of reef, or the antimony reef, was estimated by one of the vendors to average between seven and eight feet wide, and the average yield at about 1 oz. per ton. Clearly the method of sampling adopted was very different from that which is customary to-day. What was the actual outcome of this enterprise we do not remember, but Mr. F. H. Hamilton was associated in some way with the business, and later on, in conjunction with Mr. L. Erlich and others, formed the H.E. Proprietary, Ltd., with a capital of £150,000 in £1 shares, of which 130,200 shares were issued fully paid. Some 1,400 claims were acquired in various blocks, over an extent of about forty miles, and other local interests were also purchased. To judge from the report of the company the results obtained were not sufficient to justify the extensive operations which were contemplated at the outset, and it is doubtless as a result of the exploratory work of this company that the conclusion has been arrived at that the Murchison Range is not adapted to large scale mining.

Hænertsburg and Woodbush Gold Fields.

In addition to the auriferous deposits of the Murchison Range, there are to be considered the gold occurrences of the other districts adjoining it, which are also laid open to a certain extent by the new line of railway from Komatipoort. The whole of the Haenertsburg and Woodbush country, along the slopes of the Drakensberg, is more or less mineralised, although, as Hall observes, "it has been found that the irregular leads, pockets, and eyes" of the Black Reef quartzite series, below the dolomite, carry most of the gold, and that the following up of pay values is difficult to maintain, and the workings are correspondingly erratic." Comparatively little prospecting work has been done, however, except at a few points, and the general resemblance of some of the ore deposits to those of the Lydenburg district to the south is a circumstance that leads one to look somewhat favourably upon the prospects of this less known area of the Dolomite and Black Reef series. The conditions and methods of mining would be pretty much the same as those in the "small man" ventures of the Pilgrim's Rest and adjoining centres.

AURIFEROUS ANTIMONIAL ORES.

The Question of Treatment—Suggestions From France—Shipment of Concentrates to Customs Works.

The establishment by Messrs. McArthur Forrest of a metallurgical plant for the treatment of auriferous antimonial ores at the United Jack, and the recent discussion of a paper by Mr. H. R. Adam on the subject at the meetings of the Chemical, Metallurgical and Mining Society have awakened interest in a matter that is likely to prove of some interest in the near future. The following is the text of a letter, from the office of the La Lucette Company in Paris, which may be of some help to those who propose to deal with antimonial gold ores in this country. As is generally known this class of ore has been successfully dealt with at the La Lucette Mines in France, and the company are apparently prepared to purchase it provided a sufficient supply could be guaranteed.

"I am in receipt of your letter of the 3rd August, and am very much interested by what you say. The Societe Nouvelle des Mines de La Lucette has certainly been very successful, after an experimental period, in carrying out the treatment of auro-antimonious ores, and is highly qualified for dealing with the question put forward by you. Having travelled in almost every part of South Africa, where I have installed several plants, I am familiar with the question and have already examined ores from the district in question for the Societe Nouvelles des Mines de La Lucette. The documents which we have collected on this subject are, however, incomplete, and the mining operations must have been developed considerably since the opening of the railway from Delagoa Bay to Leydsdorp. We are convinced, from our knowledge of the country and of the matter in question, that, at least at first, for various economic and commercial reasons, the establishment of treating works at the mines or even at Lourenco Marques would be a mistake. It would be best merely to establish at the mines small installations suitable for the mechanical preparation of the ore, which, as a matter of fact, would be necessary, for the separation of the extracted products into different categories and for obtaining the various concentrates exportable with the rich ores separated; it would be sufficient later on, and acting with great circumspection, to take up the construction of a few simple furnaces on the spot for the utilisation of the dumps of the bye-products which may accumulate; and the treatment for or by amalgamation, in respect of which we have made sure of success in spite of the presence of antimony, thanks to hand plant or special attention. The industrial and financial situation of the Societe Nouvelle des Mines de La Lucette would enable it, by acting as Customs works, or as purchaser of ore, according to a formula to be determined, to consider the question of establishing a treating works for ore exported to the most convenient destination; for this purpose it would obviously be necessary for the company to have particulars respecting mineral reserves of mines opened up and guarantees for sufficient regular delivery. We are inclined to think that it would interest the mining industry of South Africa, with which we are familiar, to apply to a company such as ours for the treatment, at a place to be selected, of ores for export, in spite of the apparent sacrifice to the country of the renunciation of the advantages of having the metal treating works in the locality. I shall be glad to correspond with you in the matter with a view to coming to an arrangement, and if any member of your firm should pass through Paris we would see him with pleasure."

What Excessive Gold Supply May Do.

The National City Bank of New York in its September circular points out in a lucid way what may result from an excessive importation of gold into the United States. In part it says the following:—

> The Allies still have large holdings of gold. The appeal to the French to exchange their holdings of coin for paper money has brought in many millions, and a similar request lately by the British Government has resulted in a noticeable increase in reserve of the Bank of England. Notwithstanding increased liabilities due to the big loan, the reserve now stands at 24 per cent., compared with 16 per cent. a month ago. However, these gains are small compared with payments to be made here. Moreover, continued importation of gold is a menace to orderly progress of business in this country. So long as the fabric of credits is not enlarged, additions to gold reserves will do no harm, and serve to broaden the base under the situation; but bank credit is so readily available for a thousand inviting purposes that it is too much to expect of the people that they will abstain from using it for long at a time. They have never persisted in such self-restraint, and bankers have never been proof against their persuasions. There is no money trust strong enough to close the vaults against the public when it is in earnest about wanting accommodations. There is a normal status, or equilibrium, between countries of the world, in industry, in gold holdings, and in all relations with each other. That status is not fixed, but cannot be changed violently without reaction. It is being changed now, and the prudent man will beware of the reaction. The United States is obtaining more than its share of the world's gold, as gold would be distributed under ordinary conditions, and when the war is over it will not be able to hold the excess. If new supplies have been stored away, unused and unpledged, and can be released without disturbance, well and good; we will have simply lost the interest on their value, and played the part of miser. But if we proceed to build credits on the new store, those credits will have to be liquidated when the base is removed, and liquidation of credits under such conditions is a painful experience. Moreover, the very use of these credits will have effect of expelling the base that supports them, as soon as normal trading conditions are restored. For if under temporary protection and stimulus afforded by the war, our industries are expanded on basis of higher wages and costs, we will be driven out of every foreign market as soon as the war is over, and lose no small share of our home trade also, with the result that the trade balances will turn heavily against us. It is impossible to use additional credit made available by further increase in gold reserves without raising costs and prices in this country; for it can only be used by extensive borrowing and buying, with inauguration of enterprises which would create a competitive demand for labour at a time when supply of labour is limited; and however desirable it may be to have wages rise by natural progress, nothing will be gained from a spasmodic movement which ends in loss of markets, widespread unemployment and prolonged stagnation. Wages can only be sustained and advanced by a steady demand for products of industries, and this cannot be had if our economic relations with the rest of the world are ignored and heedlessly thrown out of gear. The war is not going to last long enough for us to get far on a career planned only for war conditions. We should not be alarmed over advent of prosperity, because it is likely to end in trouble, but an expansion of indebtedness based on conditions so plainly temporary would be extremely shortsighted. Present bank reserves are more than sufficient to handle any safe degree of expansion, and it will be better that the country does not receive additional capital in gold. Whatever is coming to us under these extraordinary trade conditions had better be taken in interest-bearing securities or dividend-paying shares of ownership in going properties, at home or abroad.

THE BUYING AND SELLING OF ORES.—I.

[By Charles H. Fulton.]*

The buying and selling of ores and metallurgical products is a great and highly important business in the United States, and one that concerns not only the miner and the metallurgist but the industrial world in general. In this paper the attempt is made to outline clearly its underlying principles, the subject matter being based on personal experience and investigation. The author has endeavoured to present the material impartially, and for that reason many of the statements and figures regarding metallurgical practice should be taken as illustrative rather than as applying exactly to average operating conditions. Moreover, the statements as to metal prices and trade methods are to be considered as applying to normal business, not to special conditions that have developed as a result of the war in Europe. As regards the style, technical words and phrases have been avoided as much as possible in order to make the paper easily understood by anyone who might be interested. In estimating the value of an ore an intermediate metallurgical product (other than a refined metal) the basis used is the price of the refined metal at some principal market centre, such as New York, at the time the valuation is made. The average price of all copper for 1913 was 15·5 cents per pound, and for electrolytic copper 15·269 cents per pound. The prices for other metals for the year were as follows: Lead, 3·862 cents per pound; spelter, 5·213 cents per pound; silver, 54·811 cents per troy ounce. If the metal contents, in pounds for the base metals and in troy ounces for the precious metals, per avoirdupois ton be multiplied by the prevailing price of the refined metals, the sum of the products will be the gross value of the ore. There is, however, a wide difference between the gross and the net value of a ton of ore. From the gross value must be deducted, first, the total cost of mining the ore, and then the total cost or charge for treatment, which includes some or all of the following items: Freight to treatment plant, milling or smelting charge, charge to compensate for losses of metal in treatment, charge for penalties imposed on the desirable constituents in the ore, charge for freight to refining centre, charge for refining the metal charge to cover the selling costs of the refined metal. Which of these charges are imposed and what the amount of each charge is depend on the ore, the method of treatment, and the number of firms that handle the ore and metals in the process from ore to refined metal. The types of companies that handle ores and metallurgical products may be classified as follows:—

1. Mining and smelting companies or mining and milling companies, which control all the operations from the mining of the ore to the production and selling of the finished metal.

2. Mining companies, which mine and sell ore on certain schedules to smelting or milling companies.

3. Custom smelters or mills which purchase ores and also operate refineries and produce refined metals or sell intermediate metallurgical products to refineries.

4. Refining companies, which purchase mètallurgical products, such as matte, and crude metals, and some ores, and produce refined metals.

5. Selling agencies, which place the refined metals on the market.

It is apparent that an ore or the products derived from it may go through many hands before the finished metal reaches the market, and that metallurgical business may be complex. In this report the essentials of the commercial side of metallurgical work are discussed in some detail.

(To be continued.)

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* Extract from Technical Paper 83, just issued by the Bureau of Mines.

YIELD, COSTS, AND PROFITS IN SEPTEMBER.

Official Analysis by the Transvaal Chamber of Mines.

The monthly Transvaal Chamber of Mines analysis of gold production in the Transvaal for September, 1915, shows, *inter alia*:—

THE WITWATERSRAND.

	Tons.	Value.	Ounces.	Yield per ton.		Cost per ton.		Profit.
		£		s.	d.	s.	d.	
Aurora West United	15,066	18,036	4,246	23	11	18	4	4,039
Bantjes Consolidated	20,500	22,938	5,400	22	0	20	8	1,112
Brakpan Mines	61,800	88,072	20,734	28	5	18	2	31,022
City & Suburban	28,500	51,873	12,212	36	5	20	11	21,183
City Deep	61,000	121,013	28,489	38	8	19	1	60,086
Cons. Langlaagte	54,700	70,092	16,501	25	1	15.	3	28,423
Cons. Main Reef	28,090	41,963	9,879	29	11	19	8	13,547
Crown Mines	207,000	267,849	63,057	25	11	16	1	95,515
Durban Roodepoort	13,947	14,506	3,415	20	7	16	1	3,247
Durban Rood't Deep	26,600	37,091	8,732	27	6	22	10	5,850
East Rand Prop. M.	180,000	225,962	53,196	24	10	18	6	53,923
Ferreira Deep	56,410	104,783	24,668	36	9	18	3	49,968
Geduld Proprietary	25,700	39,759	9,360	30	11	21	4	12,234
Geldenhuis Deep	55,000	70,882	16,687	25	9	21	1	11,484
Ginsberg	15,375	17,794	4,189	23	1	17	10	4,030
Glencairn Main Reef	21,300	14,374	3,384	13	0	11	2	1,946
Govt. G.M. Areas	49,100	66,732	15,710	27	2	21	2	14,790
Jupiter	18,600	12,323	2,901	13	3	21	2	*7,626
Knight Central	28,030	31,578	7,434	22	6	19	2	4,062
Knights Deep	106,800	†84,666	†19,932	15	10	12	1	15,211
Langlaagte Estate	51,236	59,549	14,019	22	4	17	8	13,626
Luipaardsvlei Estate	21,160	24,093	5,672	22	9	19	1	3,628
Main Reef West	25,020	28,634	6,741	22	11	19	6	3,671
May Consolidated	14,300	11,405	2,685	15	11	14	6	1,003
Meyer & Charlton	14,544	34,487	8,119	46	11	18	4	20,767
Modderfontein B	45,000	96,793	22,787	43	0	14	11	61,197
Modder Deep Level	34,500	63,210	14,881	36	8	16	5	34,746
New Goch	29,700	29,347	6,909	19	7	14	2	8,035
New Heriot	13,100	23,571	5,549	35	11	22	0	8,815
New Kleinfontein	53,800	69,472	16,355	25	10	17	2	22,339
New Modderfontein	51,000	104,511	24,604	41	0	17	5	57,762
New Primrose	23,100	19,276	4,538	16	8	11	6	5,920
New Rietfontein		2,069	487					*1,265
New Unified	13,550	14,094	3,318	20	6	13	4	4,874
Nourse Mines	57,400	69,871	16,449	24	4	19	11	11,095
Princess Estate	21,500	27,878	6,563	25	11	25	7	273
Randfontein Central	206,178	246,568	58,047	23	10	17	11	58,756
Robinson	55,300	79,908	18,812	28	11	14	5	38,403
Robinson Deep	52,400	75,108	17,682	28	8	18	11	24,046
Roodepoort U.M.	33,851	31,272	7,362	18	6	16	10	2,539
Rose Deep	66,300	76,735	18,065	23	2	17	1	18,535
Simmer & Jack	68,900	†67,781	†15,957	19	8	13	9	26,714
Simmer Deep	61,000	†51,164	†12,045	16	9	16	7	3,352
Van Ryn	38,250	47,638	11,215	24	11	14	6	19,599
Van Ryn Deep	42,020	78,664	18,519	37	5	17	3	42,399
Village Deep	52,400	78,371	18,450	29	11	19	5	25,771
Village Main Reef	30,000	54,791	12,899	36	6	18	7	25,685
Vogelstruis Estate	13,276	13,818	3,253	20	10	18	11	1,300
West Rand Central	1,930	2,846	670	29	6	28	8	80
West Rand Cons.	31,200	39,126	9,211	24	9	18	3	10,278
Witwatersrand	41,900	53,135	12,509	25	4	14	4	23,158
Witwatersrand Deep	41,730	54,188	12,757	25	4	17	7	16,034
Wolhuter	34,800	43,463	10,232	25	0	16	7	13,672
Miscellaneous producers	—	7,426	1,748	—		—		—
OUTSIDE DISTRICTS.								
HEIDELBERG—								
Nigel	10,500	13,678	3,220	26	1	28	7	*1,505
Sub-Nigel	7,240	†15,750	†3,708	43	6	31	3	2,849
BARBERTON—								
Barrett	3,598	1,512	356	8	5	—		
Fairview (T.C.L.)	1,760	3,738	880	42	6	28	9	1,142
Sheba	6,920	10,581	2,491	29	6	25	3	1,797
Worcester Exploration	5,150	3,143	740	12	3	15	2	*771
KLERKSDORP—								
Quest G.M. & Dev. Co.	3,801	2,770	652	14	7	13	0	295
LYDENBURG—								
Ceylon Lydenburg	—	200	47	—		—		112
Glynn's Lydenburg	4,026	6,176	1,454	30	8	19	11	2,307
Rietfontein (T.C.L.)	1,077	1,555	366	28	11	20	7	92
Transvaal G.M. Estates	12,810	30,320	7,138	46	6	23	9	14,115
Miscellaneous producers	—	27,452	6,463	—		—		—
Totals (outside districts)	56,897	116,875	27,515	31	0	24	2	20,433
Totals (Witw'sr'd)	2,413,863	3,182,548	749,235	26	2	17	4	1,030,853
Grand Totals	2,470,760	3,299,423	776,750	26	3	17	6	1,051,286

* Loss.

RHODESIAN SEPTEMBER RETURNS.

Globe and Phoenix G.M. Co., Ltd.

Mill.—Tons treated, 6,008; yield, 6,153.24 ozs. (in addition 1,240 ozs. have been placed to reserve). Concentrates.—Tons treated, 229; yield, 528.03 ozs. Sands.—Tons treated, 4,319; yield, 845.47 ozs. Slimes.—Tons treated, 2,269; yield, 263.80 ozs. Total value, £32,737 1s. 1d., excluding reserve.

Willoughby's Consolidated Co., Ltd.

The Matabele Queens Co., Ltd.—Queens Mine.—Mill ran 690 hours; tons crushed, 1,730; yield, 400.32 ozs. of fine gold; value, £1,665 5s. 6d.; sands and slimes treated, 1,730 tons; yield, 365.3 ozs.; value, £1,519 5s. 9d.; total recovery, 765.62 ozs. of fine gold, valued at £3,184 11s. 3d.

Eileen Alannah Mining Co., Ltd.—Eileen Alannah Mine.—Mill ran 516 hours; tons crushed, 3,687; yield, 393.93 ozs. of fine gold; value, £1,634 18s. 3d.; sands and slimes treated, 4,300 tons; yield, 1,510.23 ozs.; value, £6,265 9s.; total recovery, 1,904.16 ozs. of fine gold, valued at £7,900 7s. 3d.

Sheba Mine Tribute.—Clean up at mill site: Yield, 15.37 ozs. fine gold; value, £64 6s. 9d.

Queen's West Mine Tribute.—Mill ran 624 hours; tons crushed, 234; yield, 128.87 ozs. of fine gold; value, £535 18s. 6d.; slimes treated, 465 tons; yield, 92.08 ozs.; value, £382 19s. 6d.; total recovery, 220.95 ozs. of fine gold, valued at £918 18s.

Grand Manica Mine Tribute.—Mill ran 520 hours; tons crushed, 270; yield, 30.9 ozs., of fine gold; value, £128 5s. 6d.; cyanide treated, 260 tons; yield, 5.92 ozs.; value, £24 11s. 6d.; total recovery, 36.82 ozs. of fine gold, valued at £152 17s.

Anderson Mine Tribute.—Cyanide treated, 350 tons; yield, 16.53 ozs.; value, £68 13s. 11d.

Blanket Mine Tribute.—Mill ran 537 hours; tons crushed, 1,072; yield, 150.28 ozs. of fine gold; value, £624 11s. 9d.; total recovery, 150.28 ozs. of fine gold, valued at £624 11s. 9d.

Camelia Mine Tribute.—Mill ran 663 hours; tons crushed, 1,273; yield, 316.4 ozs. of fine gold; value, £1,317 11s. 9d.; cyanide treated, 600 tons; yield 39.6 ozs. of fine gold; value, £166 1s. 3d.; total recovery, 356 ozs. of fine gold, valued at £1,483 13s.

North Bonsor Mine Tribute.—Mill ran 420 hours; tons crushed, 950; yield, 232.78 ozs. of fine gold; value, £968 18s. 9d.; cyanide treated, 900 tons; yield, 72.56 ozs. of fine gold; value, £303 5s.; total recovery, 305.34 ozs. of fine gold, valued at £1,272 3s. 9d.

Bonsor Mine Tribute.—Mill ran 552 hours; tons crushed, 800; yield, 111.76 ozs. of fine gold; value, £465 0s. 6d.; total recovery, 111.76 ozs. of fine gold, valued at £465 0s. 6d.

Eiffel Blue Mine.—Mill ran 687.5 hours; tons crushed, 1,309; yield, 624.26 ozs. of fine gold; value, £2,593 18s. 6d.; cyanide treated, 780 tons; yield, 46.29 ozs.; value, £192 4s. 3d.; slimes treated, 1,200 tons; yield, 33.9 ozs.; value, £140 15s. 9d.; total recovery, 704.45 ozs. of fine gold, valued at £2,926 18s. 6d.

Amalgamated Properties of Rhodesia (1913), Ltd.

Champion Mine.—Mill ran 110 hours; tons crushed, 160; yield, 32.98 ozs. of fine gold; cyanide treated, 140 tons; yield, 57.78 ozs. of fine gold; total recovery, 90.76 ozs. of fine gold, valued at £378.

Constance Mine.—Mill ran 644 hours; tons crushed, 1,210; yield, 163.70 ozs. of fine gold; total recovery, 163.70 ozs. of fine gold, valued at £681.

Brompton Mine.—Mill ran 696 hours; tons crushed, 780; yield, 156.99 ozs. of fine gold; tons treated, 600; yield, 54.80 ozs. of fine gold; total recovery, 211.79 ozs. of fine gold, valued at £881.

Liverpool Mine.—Mill ran 520 hours; tons crushed, 518; yield, 106.62 ozs. of fine gold; cyanide treated, 200 tons; yield, 59.98 ozs. of fine gold; total recovery, 166.60 ozs. of fine gold, valued at £698.

Transvaal and Rhodesian Estates, Ltd.—Fred Mine.—Mill ran 650 hours; tons crushed, 1,800; yield, 749.95 ozs. of fine gold; cyanide treated, 1,800 tons; yield, 193.44 ozs. of fine gold; total recovery, 943.39 ozs. of fine gold, valued at £3,918.

R. M. Nairn and Co.

The Criterion Gold Mines, Ltd.—Glen Rosa Mine.—Mill, 10 stamps, ran 624 hours; tons crushed, 1,100; yield, 1,080.02 ounces; value, £4,495 6s. 6d.; tons cyanided, 650; yield, 289.82 ounces; value, £1,212 17s. 6d.

Criterion Mine.—Mill, 10 stamps, ran 673 hours; tons crushed, 1,379; yield, 183.07 ounces; value, £760 9s.; tons cyanided, 600; yield, 15.09 ounces; value, £62 14s.

Cottage Mine.—Mill, 4 stamps, ran 602 hours; tons crushed, 325; yield, 49.42 ounces; value, £205 6s. 9d.; tons cyanided, 170; yield, 13.43 ounces; value, £55 17s.

The Cornish Syndicate.—North Bonsor Mine.—Mill, 10 stamps, ran 420 hours; tons crushed, 950; yield, 232.78 ounces; value, £968 18s. 9d.; tons cyanided, 900; yield, 72.56 ozs.; value, £303 5s.

The Intabanenda Syndicate.—Intabanenda Mine.—Mill, 5 stamps, ran 513 hours; tons crushed, 410; yield, 122.1 ounces; value, £506 18s.

Total output from all sources, value £8,571 12s. 6d.

Gold Fields Rhodesian Development Co., Ltd.

Antelope Gold Mine (Rhodesia), Ltd.—Plant ran 26 days; tons crushed, 4,089; total value of yield, £8,827; profit, £2,235.

Bell Reef Development Co., Ltd.—Plant crushed 2,565 tons; yield, 1,356.11 ozs. of fine gold; value, £5,697.

Eldorado Banket Gold Mining Co., Ltd.—Plant crushed 4,073 tons; value, £10,201; profit, £5,152.

The Falcon Mines, Ltd.—Plant crushed 18,660 tons; Blister copper and gold produced from tonnage crushed, 308½ tons (2,000 lbs.), containing 3,525 ozs. of gold and 6,046 ozs. of silver; value, £30,508. Of this 12,544 tons from sulphide ore, value 47s. 6d., and 6,106 tons from oxidised ore, value 21s. Product being shipped—profit not available.

The Gaika Gold Mining Company, Ltd.—Plant crushed, 3,083 tons; total value of yield, £7,101; profit, £2,906.

Golden Kopje Proprietary Mines, Ltd.—Plant ran 20 days; tons crushed, 11,465; yield, 2,446.76 ozs. of fine gold; total value, £10,292.

The Shamva Mines, Ltd.—Plant crushed 47,534 tons; total value of yield, £37,665; estimated profit, £17,183; working costs, 103.4d. per ton. This includes slag treated realising £1,300.

Selukwe Columbia Gold Mine Ltd.—Wonderland Mine.—Plant ran 28 days; tons crushed, 1,426; value, £2,987; working expenses, £2,321. In addition, concentrates valued at £180 produced during the month of September, but not treated.

Yankee Doodle Tribute.—Plant crushed, 1,433 tons; total value of yield, £1,250.

Thistle Etna Gold Mines, Ltd.—Plant crushed 1,502 tons; total value of yield, £2,186; working expenses, £1,801. In every case Government royalty and all London expenses have been added to working costs.

The Crescens (Matabele) Mines and Land Co., Ltd.—Veracity Tribute.—Plant crushed, 250 tons; total value of yield, £677.

The Gold Fields Rhodesian Development Co., Ltd.—Dalny Tribute.—Plant crushed, 1,651 tons; total value of yield, £1,060.

Louise Grand Tribute.—Plant crushed, 1,007 tons; total value of yield, £556.

Owl Tribute.—Plant crushed, 1,636 tons; total value of yield, £5,533.

The Insizwa Mines Ltd.—Nelly Mine Tribute.—Plant crushed 840 tons; total value of yield, £2,749.

The Planet Arcturus Gold Mines, Ltd.—Planet Tribute.—Plant crushed 805 tons; total value of yield £1,685.

Arcturus Sands Tribute.—Plant treated 600 tons; total value of yield, £280.

THE COMPARATIVE COSTS OF COMPRESSED AIR AND ELECTRICITY FOR USE IN MINE STOPE HAULAGES.

[By Mr. A. E. Middleton]*

The superior economy of electricity over compressed air for use on main and auxiliary underground haulages, whether endless rope or main and tail, can hardly be questioned. Such haulages work continuously for the whole or the greater part of the tramming shift, and require a considerable amount of power. In many mines of the Eastern Rand, however, a large number of winches are employed in stopes and winzes, acting as feeders to the main haulage roads. Their work is generally intermittent and often confined to clearing loose rock from the working face at the beginning of the shift. In such cases the over-all economy of electric power is more or less questionable, and requires investigation in any given case. The following comparative conditions have to be considered:—(1) Relative consumption of air and electricity corrected for transmission losses (and in the case of electricity probably for transformation losses) in terms of £ s. d. at the winch or motor. (2) Relative maintenance costs. (3) Relative first costs (including supply pipes or cables). Taking the first item, the efficiency of an electrically-driven winch can be estimated from the over-all efficiencies of the motor and gearing with a sufficiently close approximation to accuracy for the present purpose, it being assumed that the gearing is of standard double reduction spur type, or enclosed worm in oil bath and in good order. The consumption of electricity for the performance of a given amount of work follows directly. To arrive at the quantity of air used by an air winch in the performance of a given amount of work, the method adopted in practice was to haul at a definite speed a given load up an even incline of a length and gradient representing the average of the mine, actually 235 feet with a 10 degree stope. The cylinder dimensions, point of cut off, gearing ratios and stop valve air pressure being known, the quantity of air used for the work done was directly arrived at. The difference between the air pressure at the winch and at the main compressor was then taken to arrive at the transmission losses, and the whole result converted into terms of pence per ton wound. The h.p. developed is 21.2 and the cost of air 0.193d. per ton handled. To arrive at the cost of energy supplied to an electric winch working under the same conditions developing 21.2 h.p., the efficiency of the gearing and motor (15 h.p. continuous rating) is taken at 85 p.c. and 87 p.c. respectively, or an over-all efficiency of 74 p.c. The efficiency of transmission and transformation between the point of purchase on the surface and the working point underground is taken as 95 per cent.; under these conditions the cost per ton handled is 0.033d. In other words, the air winch costs five or six times more for power to run than the electric. This result is quite what one would have expected, but as will be seen later, by no means covers the whole ground.

Turning to the item repairs and maintenance, this may be divided into wages and stores. Experience with some sixty odd air winches on one mine gives a cost for maintenance wages averaged over many months of £2 12s. per winch per month. On the same mine, the average figure for renewals, i.e., spare parts from stock, is £1 3s. 8d. per winch per month. Oil, packing and sundry shop made spares are not included in the foregoing, but the cost of taking down and re-erecting in fresh positions to meet stoping requirements from time to time is included. The writer has been unable to obtain any figures of a similar scale for electric winches. Smaller numbers than the foregoing are working on several mines, but information is not available. The general opinion appears to be that repairs and maintenance are on a much lower scale. This is certainly what we would expect from the even turning movement and high-class gearing used on an electric winch compared with the reciprocating parts of the air winch, which is seems impracticable to keep in first-class order under mine conditions. It would probably be fair to assume that the aggregate maintenance, involving complete renewal of the mechanical parts, could be spread over a period of ten years, the corresponding figure for motor, eight years, and for the controller, etc., six years. If the respective first costs of these parts are £100, £50 and £20, this would give a monthly expenditure on spares of £1 12s. 6d. per winch. A comparison of the amount of labour involved in overhauling an electric winch with that required for an air winch of the same size leads one to estimate the figure for wages at £1 6s. per month, giving a total of £2 18s. 6d. per winch per month for repairs and maintenance. Turning to the last item—relative first costs—this has to be divided into two sub-items, viz., first cost of winches, and that of the necessary pipes and cables to supply them. As regards the winches themselves, the average price of the electric winch appears to be slightly higher than that of the air machine. In the cases quoted the relative prices are £170 and £130 rsepectively, but the electric winch is capable of developing nearly 30 per cent. higher power on a one-hour rating, besides having a greater overload capacity, so that, power for power, the difference in first cost would be quite small. So far as we have seen then, the comparison is decidedly in favour of electricity. With approximately the same first cost the maintenance is decidedly lower, and the power cost of the order of 1-5th or 1-6th of that of air. The crux of the question appears to lie in the matter of supply pipes and cables. In practice it is not possible to debit any appreciable portion of the cost of air mains to winches in mines where development and stoping are both carried out by machine drilling. Air has to be carried long distances to the working faces, and the extra length and cross section required at any point for a winch is practically negligible. On the other hand, apart from pumps and haulages generally situated on the main arteries of the mine, no electric power is available, and the cost of extra cabling has to be debited in toto to the electric winch.

As an example of the large amount of expenditure involved under this head, it was recently estimated for the mine referred to above, in which some sixty odd air winches are in use, that not less than 32,000 feet of cable would be required, although the mine is already equipped underground for electric pumps and haulages. At the present time, owing to the all-round increase in prices, it is difficult to give a close figure for the cost of this equipment. But 500 volts supply pressure may be assumed, and also that armoured paper or bitumen cables would be used. Probably the cost of cabling under these conditions would not be less than 2s. 6d. per foot erected underground, or an average first cost of £66 per winch. We have seen that the saving in power cost is put at 0.16d. per ton handled. Now a winch operating a long stope face may handle as much as 3,000 tons per month. On the other hand a winch used for clearing out a development winze will not handle more than 750 tons per month, and possibly a good deal less. The saving in power cost is therefore £2 and 10s. respectively, making, together with the saving in maintenance costs, a total saving amounting from a maximum of £2 17s. per month down to £1 7s. per month, or even less. It is clear that on this basis the saving from reduced power and maintenance costs will require, in a favourable case, practically two years to pay for the extra cost of the supply cables, and, in the less favourable case, about four years. This is not a very tempting proposition as it stands, but it is obviously capable of modification. In all cases where the tonnage handled is considerable, say 1,000 tons or over, and the extra cost of cabling does not exceed £20 or so, the additional first cost should be recovered in a year, and thereafter there will be a clear gain in running costs. On the other hand, where long lengths of cable have to be laid, and the tonnage is small, the economy is doubtful. Summing up, one may say that although a considerable field is open for electrically-driven winches in the flat mines on the Eastern Rand, the heavy cost of cables is the chief adverse factor against their adoption. An electrical coal-cutter uses about the same horse power but works for longer hours, displaces expensive hand labour, and can therefore carry a much higher first cost for cables. It cannot be said that any effective substitute for the present safe and efficient, but expensive paper or bitumen armoured cables, is in sight; but such a substitute is highly desirable from the mining point of view. In conclusion, it must be borne in mind that the losses of an underground compressed-air system from radiation and leakage are very large indeed, and everything (such as the substitution of electric for air-driven winches) which tends to reduce the total length and cross-section of the air mains is a direct gain to the efficiency of the rock drill system. But as the conditions of every mine in this respect are different, this aspect has not been enlarged upon.

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* Paper read before the South African Institute of Electrical Engineers.

Manicaland Gold and Copper Output.

The mineral output of the territory of the Companhia de Mocambique (Manicaland) for the month of September, 1915, was as follows:—Reef—Mill: Gold won (fine), 251 ozs. 3 dwts. 11 grs.; tons crushed, 784; value, £1,041 1s. 6d. Concentrates (estimated): Gold (fine), 4 ozs.; tons, 2 (also contains silver and lead, estimated value £11 15s. 7d.; value, £18. Alluvial: Gold won (fine), 408 ozs. 10 dwts. 14 grs.; cubic metres dredged, 42.704; value, £1,693 10s. 1d.

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THE WATER SUPPLY OF THE RAND.—XII.

[By W. Ingham, Chief Engineer, Rand Water Board.]*

Does Pumping Pay?

For some reason or other farmers are usually adverse to the installation of pumping plant for irrigating land. Whether it is due to the difficulty of understanding the action of an engine and pump or to the working costs being too high in most cases, it is impossible to say, but if water can be raised at one penny per 1,000 gallons on a 100 ft. lift it will pay the farmer handsomely if he grows lucerne, wheat, root crops, peas, beans, vegetables, or high class fruit. Take lucerne as an example, and suppose that six crops can be obtained per annum. The average quantity of water required per crop will be about 100,000 gallons, which is roughly a 4½ inch watering. A ton of dried hay can be obtained per acre crop, and the average value of lucerne on the Rand may be taken at £4 10s. per ton. The total revenue for the six crops will therefore be £27, which, after deducting working expenses for harvesting, railing, etc., will yield at least £15 net. Now water can be raised by well-designed pumping plants capable of serving areas of from 50 to 100 acres, at less than one penny per 1,000 gallons so long as the lift does not exceed 100 ft. As 600,000 gallons are required for the six crops, the cost for water will be 600 pence, or £2 10s., leaving £12 10s. profit per acre per annum. Even if the pumping cost 2d. per 1,000 the profit would still be £10 per acre. With large pumping installations the cost, including redemption and interest, should not exceed two-thirds of a penny per 1,000 gallons. The same reasoning will apply to the other crops mentioned above, but the profits will vary with the value of the crop. On the Karroo, where green fodder is difficult to obtain during a season of drought it will often pay to lay out, as an insurance, a few acres of lucerne under a borehole. Anyone who knows the trouble which farmers have in keeping their sheep alive during a drought on the Karroo will realise how necessary it is to provide for such a contingency. Dry land alongside a river which can be purchased at £3 or £4 per morgen can be increased in value to £160 or £180 per morgen by placing it under irrigation and establishing lucerne or fruit trees. The cost of irrigation schemes (gravitation) in South Africa ranges from £4 to £25 per morgen, but £12 or £14 is a fair expenditure for first-class land.

Afforestation.

This subject has recently received considerable attention in South Africa, and it would be beneficial to the country generally if the planting of trees was prosecuted with more vigour. Careful observations in the forest of Hallette, France, in 1874, showed that taking the rainfall over the forest at 100, that in the open country was 92·5 per cent., while that under the trees was only 62 per cent. That is to say, the influence of the forest increased the rainfall by 1⅓ inches, or about 7·5 per cent. Owing, however, to the evaporation under the trees being only one-third that on the open ground the effective rainfall was increased in the ratio of 1 for the open ground to 1·44 in the forest, so that reduced evaporation has a far greater effect on the run-off than the direct increase in the rainfall. Afforestation equalises the flow of rivers by reducing the floods and increasing the dry weather flow. It also prevents the formation of sluits and gullies owing to the binding effect which the tree roots have on the soil. As far back as 1860 the value of planting trees was recognised in the High Alps, and laws were passed to encourage afforestation so as to reduce the denuding effect of the water flowing down the hill sides. I am quite sure that South Africa, and more particularly the Karroo, would be much improved by the systematic planting of trees.

Agriculture.

It is a blot on South African agriculture that we should import in one year foodstuffs and produce to the following extent:—Corn and grain, £1,354,311; flour and meal, £744,906; dairy products, £887,000; eggs, £77,560; hams, bacon and salted meats, £268,112; frozen and preserved meats, £264,000. To this should be added the expenditure for jams, fruit and vegetables. The above list shows there is plenty of opportunity for South African farmers, and it is hoped that they will rise to the occasion. The cultivation of vines can also be increased considerably, and more wine exported, but the quality must be regular and better than that produced at present. The production of sugar is gradually increasing, and Natal is now capable of supplying all the requirements of the Union. The production of wattle extract, under a new local process, should also be instrumental in improving the wattle industry, for instead of forwarding the bark to Europe, it will now be possible to send it in the form of extract, and this will mean a great reduction in freight, to say nothing of the benefits derived through being able to sell the bark on the spot. South Africa is the home of luxuries, for gold, diamonds, ostrich feathers and fruit are the chief exports. One is inclined to think that if more attention was paid to the production of foodstuffs and produce that South Africa would be in a much sounder position. The hustle in all departments of industrial life is being felt in the agricultural world, and the consumer has to pay, and rightly so, for the professional services of technical men in the employ of the Government. This is reflected in the higher prices of food, and as a farmer in North Caroline tersely put it:—" When a feller has got to know the botanical name of what he's raising, an' the entomological name of the insect that eats it, an' the pharmaceutical name of the chemical that will kill it, somebody's got to pay." Of course higher wages to farm labourers and the more educated tastes of the farmer have had a great influence in tending to raise the prices of food.

Motor Ploughs.

The plough shown on the screen is propelled by a single-cylinder four cycle petrol engine, capable of developing 8½ b.h.p. at 1,000 revolutions per minute. The depth of cut is from six to seven inches and the consumption of petrol two gallons per acre, or a fuel cost of 4s. 8d. per acre in the Transvaal based on the present price of petrol. The area which can be ploughed per eight-hour day is from 2½ to 3 acres, according to the class of soil.

The Rand Goldfields.

As engineers in this district are concerned, either directly or indirectly, with the production of gold, I desire to submit a few notes on this great industry. In the first place, I wish to congratulate the mine managers and engineers on the progress made during the last few years in reducing the death-rate of natives employed on the mines. The native mortality from natural causes for 1913 was 22·1 per 1,000, as compared to 14·9 per 1,000 during 1914, or a reduction of 7·2 per 1,000. Deaths from accidents during 1913 were 4·5 per 1,000, as compared to 3·5 per 1,000 in 1914, or a reduction of 1 per 1,000. Some portion of the former reduction is, of course, due to the absence of natives from tropical districts, but another portion of the reduction has been due to the better conditions under which the native has had to work. The number of natives employed on the mines of the Rand is in the neighbourhood of 170,000, so engineers have been responsible for the saving of quite a large number of lives by improving the conditions on the mines. The magnitude of the Rand gold fields is best realised by comparing it with the world's output of gold. Sir Lionel Phillips, at the meeting of the Central Mining and Investment Corporation, Ltd., in London, on the 27th May, stated that the world's output of gold in 1914 was about £92,000,000, to which the Transvaal contributed £35,588,000. That is to say, the Transvaal produced 38·7 per cent. of the world's output. It may also be mentioned in passing that no less a sum than £11,000,000 is expended annually for machinery, stores, etc. Mr. Waller, in his recent address to the local

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* From Presidential Address read before the S.A.I. of E.

Chamber of Mines, stated that up to the end of 1913, the ore mined on the Rand amounted to 280 million tons. If we add 30 million tons for 1914, and take an additional 15·7 million tons for the half-year ending June 30th, 1915, the total quantity mined would be over 325 million tons. Taking 13 cubic feet to the ton, this would represent a block covering an area of 50·51 square miles and 3 feet high. The tonnage milled in 1904 was given some time ago by your ex-President, Mr. E. J. Way, as 8,058,295 tons, as compared to 26,369,946 tons milled during 1914. These figures show that the tonnage milled is now over three times greater than it was 10 years ago. The average grade of the ore milled during 1914 was 26s. 9d. per ton, so the profit was 9s. 5d. per ton. Mr. Way has also stated that the working costs per ton milled in 1904 were 24s. 4d., whereas, according to the returns for 1914, they had been reduced to 17s. 1d. The reduction in working costs during the last 10 years is therefore 7s. 3d. per ton, and this has made it possible to run mines profitably which are returning less than 4 dwts. per ton milled where the mining conditions are favourable. The amount of unrecoverable gold in well-designed plants is about one-third of a dwt., and it is difficult to see how this can be reduced economically beyond one-fourth of a dwt. Mr. Leslie stated some time ago that the Consolidated Gold Fields of South Africa were extracting 95·104 per cent. of the total gold in the ore contents, and the residual value was only 0·243 dwts. Even such a small reduction as 0·07 dwt. would, however, add a large sum to the annual dividends. The dividends paid in 1893 were £1,042,539, and this was increased to £3,934,958 in 1904. Last year the dividends were £8,404,060, although the year 1909 holds the record with a profit of £9,504,621. The money actually expended on the gold fields of the Rand is estimated by Mr. H. O'K. Webber to be in the neighbourhood of from £85,000,000 to £90,000,000, but this does not include money which has been taken from profits and expended on works. The coal industry is also a very large one, as may be gathered by the output of 1914, which was no less than 5,157,268 tons. A number of our members are also connected with this industry and have been instrumental in reducing the working costs to such an extent as to make mines profitable which were previously run at a loss.

CORRESPONDENCE AND DISCUSSION.

What is "Adequate" Mine Ventilation.

To the Editor, *South African Mining Journal.*

Sir,—May I add a few remarks to the article on ventilation, appearing in a recent issue. The most important of the many regulations which relate to mining operations throughout the world, are those which deal with the ventilation of underground workings. In various forms mining laws demand that sufficient air shall circulate through every mine to dilute and render harmless any noxious or inflammable gases which may be derived from natural sources or from actual mining operations. That the supply of pure air has a direct bearing upon the health of the worker is a fact recognised in all mining communities. The managers of life assurance companies, whose opinions are undoubtedly based upon practical experience, do not regard as "a good life" that of a worker in a gold mine. Some companies decline to consider issue of policies to certain classes of underground workers; others demand special premiums and the general manager of one of the largest assurance companies in South Africa recently pointed out that "a great deal depends upon the condition of the lungs of the assured" and "that life assurance companies have to assume that after a man has been mining for a few years in a gold mine his lungs are more or less affected." Apart from the risk of contracting silicosis, there must be considered the dangers of pneumonia and other pulmonary diseases, which are directly connected with the quantity and temperature of air available to the miner. As the health conditions of the mines of the Rand do not appear to compare favourably with those of other mining regions it seems desirable to find some definition of what is termed "adequate" ventilation. From time to time a colliery explosion in Britain or elsewhere shocks readers of newspapers throughout the world. They regard coal mining as a particularly dangerous occupation, ignoring the fact that in Britain there are under normal conditions over a million men engaged in mining and that most of these are employed in what may be termed fiery mines. The health of a coal miner compares very favourably with that of a worker on the surface. He enjoys a remarkable freedom from lung diseases and periods of service of 40 to 50 years underground are quite common in English and French coalfields. The accident death rate in British mines is less than half that of mines in the Transvaal, ignoring the effects of phthisis and allied contributors to the heavy mortality amongst Rand miners. It is scarcely necessary to point out that the only deleterious elements found in the atmosphere of the gold mines are produced by blasting operations, and that the Mining Regulations of the Union state "that no person shall be permitted to work in any place in a mine if the air contains dust, smoke or fumes perceptible by sight, smell or other senses." As a clear atmosphere may contain injurious gases there are stated maximum amounts of these permissible in working places. Presuming that a mine complies with these conditions it is usually said to be adequately ventilated. In a paper recently contributed to the Chemical, Metallurgical and Mining Society of South Africa, Dr. James Moir has shown that it is only the very fine particles of stone dust which are injurious to health and that this fine dust will remain suspended in the air for several hours. Where there are slight movements of air the very fine particles of silica never settle to the ground, and the only method of dealing with the curse of the Rand is, therefore, to remove it from the mines by systematic methods of ventilation.—I am, etc.,

S. NETTLETON.

ANSWERS TO CORRESPONDENTS.

"R.K."—The answer is that one shaft reached the reef series in 1912 at a depth of 1,800 ft., and the other shaft was already down 555 ft. when operations therein were suspended. Sooner or later funds will, no doubt, be provided to resume operations either on the company's own behalf or for some combine into which its property may quite possibly be taken.

"S.L.B."—The complete list of small mines in the district appeared in our last issue.

"G. A. R."—H. T. Brett is the consulting metallurgical engineer. The office is in Bulawayo.

"Small Man."—Messrs. Fraser & Chalmers are the agents here.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

WRIGHT'S ROPES.

THE WEEK IN THE SHAREMARKET.

Better With More Business—Barnato Stocks Higher—Improving Outlook.

The satisfactory results of the General Elections, coupled with the growing recognition of the importance of the Rand to South Africa and the Empire, were reflected in the sharemarket this week. Shares were in increasing demand as the week wore on, and prices quickly responded. The Modder group, Springs, and Barnato stocks provided the features. Modder Deeps are now well over £5, and still apparently rising. The increased interest in Barnato stocks is, of course, not to be wondered at. For some time past several of the mines of the group have been steadily strengthening their position and prospects, and it was only to be expected that they would participate in the first upward move in the market. The best feature of the market is the improvement in tone and tendency. It is generally felt that the country and the industry have weathered the worst period of the war, and that the outlook is bound to go on growing brighter, and for that, in all the circumstances, we have every reason to be grateful.

	Frid. 23rd.	Sat. 24th.	Mon. 26th.	Tues. 27th.	Wed. 28th.	Thurs. 29th.
African Farms	7 10	7 6*	7 9*	7 9*	8 2*	7 9*
Apex Mines	16 9*	16 3*	17 0†	16 9	17 0*	17 0*
Aurora Wests	8 0*	8 0*	8 0*	8 6*	8 6*	8 6*
Bantjes Consolidated	5 6*	—	5 6*	5 0*	5 0*	5 0*
Brakpan Mines	60 0*	60 0*	60 0*	61 0*	62 0*	63 0*
Brick and Potteries	5 0*	5 0*	5 0*	—	5 0*	—
Bushveld Tins	0 3†	—	*0 6†	—	—	—
Cassel Coals	19 0*	19 0*	19 0*	19 0*	19 0*	19 0*
Cinderella Cons.	—	—	—	2 9*	2 9*	—
City and Suburbans	42 0*	42 0*	42 0*	42 0*	43 0*	42 6*
City Deeps	63 9*	63 6*	63 6*	63 6*	64 0*	64 6*
Cloverfield Mines.	5 5*	5 6	5 4*	5 4*	5 4*	5 8
Clydesdale Collieries.	12 0*	12 0*	12 0*	12 6*	12 6*	12 6*
Concrete Construction	—	—	2 6†	2 6†	2 6†	—
Con. Investments	—	14 9	14 9*	14 9*	—	—
Con. Langlaagtes	37 6*	—	37 0*	37 6*	38 0*	37 0*
Con. Main Reefs	18 9*	18 9*	18 9*	18 9*	19 0	18 9*
Con. Mines Selection	9 0*	9 3*	9 3*	9 6	9 3*	9 *
Coronation Collieries	—	—	25 0*	—	—	—
Coronation Freeholds	0 2*	0 2*	—÷	—	0 2*	—
Crown Diamonds	1 0*	—	1 0*	1 0*	—	—
Crown Mines	70 0*	70 0*	70 0*	70 0*	70 0*	70 0*
Crown Mines Deb.	£98*	£98*	£98*	£98*	£98*	£98
East Rand Centrals	2 9*	2 9*	2 9*	2 9*	2 10*	2 10*
East Rand Coals	2 6*	2 6†	2 2*	2 0*	2 0*	2 0*
East Rand Deeps	1 4*	1 4*	1 4*	1 4*	1 4*	—
E.R. Minings	—	—	—	—	—	6 9
East Rand Prop.	21 6*	21 6*	21 6*	21 6*	21 9*	22 6
Esst Rand Debs.	—	—	£84*	£84*	£84*	—
Eastern Golds	1 3*	1 3*	1 3*	1 3*	1 3*	1 3*
Frand Smith Diamds.	—	1 4	1 5*	1 4*	1 5*	1 4
Geduld Props.	32 6	32 0	32 3	32 6	32 6*	32 6*
Glencairns	2 0*	2 0*	2 0*	—	2 0*	2 0*
Glynn's Lydenburgs	—	—	10 6†	10 6†	10 6†	10 6†
Goerz and Co.	12 0*	12 0*	12 0*	12 0*	12 0*	12 0*
Govt. Areas	24 6	24 0*	25 6	26 0	26 3	26 6
Jupiters	5 9*	5 10	5 9*	6 0*	6 3*	6 3*
Kaalfontein Diamonds	—	—	—	—	0 3†	—
Klerksdorp Props.	1 6*	—	—	1 6*	1 6*	—
Knight Centrals	11 6	11 1	11 0	11 1	11 4	11 5
Knights Deeps	23 0†	23 0†	22 6	20 0*	20 0*	23 0†
Lace Props.	3 8	3 6*	3 6	3 6*	—	3 7
Langlaagte Estates	—	—	—	—	16 0*	16 0*
Luipaardsvlei Estates	7 0*	7 0*	7 6*	7 0*	7 3*	7 3*
Lydenburg Farms	5 3	4 9	5 1	5 1	4 6*	5 2
Main Reef Wests	6 9*	6 9*	6 9*	6 9*	7 0	7 1*
Meyer and Charltons	102 6*	102 6*	102 6*	102 6*	103 9*	102 6*
Middelvlei Estates	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
Modder B.'s.	111 6	110 6*	111 0*	111 6*	113 0	112 6*
Modder Deeps	93 0	97 0*	97 0*	98 9	100 0	99 6*
New Boksburgs	0 10*	0 10*	0 10*	0 10*	0 10*	0 10*
New Eland Diamonds	10 0†	—	—	10 0†	10 0†	10 0†
New Era Cons.	6 3*	6 6*	6 6*	6 9*	6 9*	6 9*
New Geduld Deeps	2 4*	2 4*	2 4*	2 4*	2 4*	2 4*
New Heriots	—	50 0†	—	—	—	—
New Kleinfonteins	24 6	24 0*	24 0*	24 6*	24 0	25 0
New Modderfontein	303 9*	303 9*	302 6*	307 6A	302 6*	307 6B
New Primrose	8 3*	8 3*	—	8 3*	—	—
New Rietfonteins	—	0 3*	—	—	—	—
New Unifieds	—	—	—	16 0*	16 0*	16 0*
Pretoria Cements	—	42 6	—	43 0*	43 0*	62 6*
Princess Estates	3 3	3 0	—	3 7	3 0*	3 0*
Rand Collieries	—	2 6†	2 6†	—	—	—
Rand Klips	4 2*	4 1*	4 1*	4 2*	4 2*	4 2*
Rand Mines	—	—	—	—	85 0†	85 0†
Rand Nucleus	1 4*	—	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps.	—	2 6*	2 9*	2 9*	2 9*	2 9*
Randfontein Est.	13 0†	13 0†	—	—	12 6†	12 6†
Robinson Deeps	20 6*	—	20 6*	20 6*	21 0*	—
Rooibergs	14 3*	14 3*	14 3*	14 3*	14 3	14 6*
Roodepoort Uniteds.	—	3 0*	3 0*	3 0*	3 0*	5 0†
Shebas	2 0†	2 3†	2 0†	2 0†	1 3	—
Simmer Deeps	1 5*	—	1 5*	1 5*	1 5*	1 7
S.A. Breweries	32 0†	32 0†	32 0†	—	—	—
S.A. Lands	2 8	—	2 7*	—	2 8	2 7*
Springs Mines	25 6*	25 7½	25 3*	25 9	27 0	27 0
Sub Nigels	10 6*	11 6*	10 6*	11 0†	11 0†	10 3
Swaziland Tins	—	20 0*	20 0*	—	—	20 0*
Trans. Coal Trusts	38 9	38 6*	38 6*	39 0*	39 0*	40 0
Transvaal Lands	12 0†	—	11 0*	12 0†	—	11 0*
Trans. G.M. Estates	25 0*	25 0*	25 0*	25 0*	25 0*	-
Van Ryn Deeps	50 6*	50 0*	51 3	51 6*	52 6*	51 9*
Village Deeps	—	33 0*	33 6*	—	—	—
Vogel Con. Deeps	0 7*	0 8*	0 8*	—	0 6*	0 8*
Western Rand Est.	0 9*	—	0 9*	—	0 9*	—
Witwatersrands	52 6*	52 6*	52 6*	55 0	55 0*	57 0
Wit. Deeps	27 0*	27 0*	27 0*	27 3*	27 3*	27 0*
Wolhuters	12 1½	12 1½	12 0	12 3	12 1*	12 0
Zaaiplaats Tins	13 0	13 0	12 6*	13 0†	12 0	11 0
Union S.A. 3¾ p.c.	—	—	—	—	£97 17 6*	—
Union S.A. 4 p.c.	—	—	—	—	£100 6 3†	—

A 50 shares. B Odd lots. * Buyers. † Sellers.

A 50 shares. B Odd lots. * Buyers † Sellers.

PERSONAL.

Mr. H. L. Templer has been gazetted a Captain in the Army Service Corps, and is at present employed in London in connection with Mechanical Transport work.

* * * *

Owing to the War, the Council of the Institution of Mining and Metallurgy have decided not to offer the usual Post-Graduate Scholarships and facilities for Post-Graduate Courses for the year 1915-1916.

Rhodesian September Output.

The Rhodesian gold output for September was declared at 76,929 ozs., valued at £321,085, a decrease compared with August of 5,615 ozs., valued at £23,408. Matabeleland contributed 36,870 ozs., valued at £153,566; and Mashonaland 40,059 ozs., valued at £167,519.

THE SAKALAVA MADAGASCAR PROPRIETARY OIL FIELDS, LIMITED,

71, STANDARD THEATRE BUILDINGS, JOHANNESBURG.

SHAREHOLDERS in the above Company are reminded that the Annual Meeting takes place on SATURDAY, 30th OCTOBER, at 7.30 p.m., in the Board-Room, Grand National Hotel, Rissik Street, Johannesburg.

By order of the Board,
C. W. HERALD, Secretary.

THE YEAR WITH THE KNIGHTS DEEP.

Points from the Annual Reports.

The report of the directors of the Knights Deep for the year ended 31st July, 1915, shows that the profit on working for the year, after making allowance for the expenditure of £3,011 6s. 7d. on renewals and replacements of machinery, plant, buildings, etc., amounted to £165,111 2s.. Sundry revenue amounted to £7,024 0s. 5d. Less: Contributions to the Miners' Phthisis Compensation Fund; expenditure due to the present war; amounts written off; provisions for Profits Tax and special war levy, and debenture interest, etc., £19,637 5s. 5d.; leaving a total credit to appropriation account of £152,497 17s. The balance at credit of appropriation account at 31st July, 1914, was £100,608 7s. 10d., making a total of £253,106 4s. 10d. This has been appropriated as follows:—For redemption of debentures and capital expenditure, £22,801 19s. 2d.; for dividends Nos. 19 and 20 of 5 per cent. and 7½ per cent., respectively, declared during the year, £92,940 15s.; for fund for additions to and renewals of machinery, plant and buildings, £9,294 1s. 6d.; less: Expended on renewals and replacements during the year and charged to working expenditure and revenue account, £3,011 6s. 7d.; total, £122,025 9s. 1d.; leaving a balance at credit of appropriation account at 31st July, 1915, of £131,080 15s. 9d. The company's investments and interests in other concerns, which stood in the books at £46,531 7s. 9d. at 31st July, 1914, now stand at £45,217 1s. 3d., or a reduction of £1,314 6s. 6d., which is accounted for as follows:—160 shares of £1 each (8s. paid) in the Witwatersrand Native Labour Association, Limited, disposed of during the year, £64; dividends received during the year ended 31st July, 1915, on company's holding in Breyten Collieries, Limited, and credited to investments, £1,250 6s. 6d.; total, £1,314 6s. 6d. At 31st July, 1915, the gold in reserve amounted to 239 fine ounces, of a value of £1,001 16s. 2d.

The report of the Superintendent Engineer, Mr. C. D. Leslie, was printed in our last isue. The manager, Mr. G. A. Chalkley, in his report, writes *inter alia*:—The following report covers the operations of this company for the year ended 31st July, 1915:—

Crushing.—Average number of stamps running, 400; tons mined, 1,173,420 (amount of waste sorted underground, not included in tons mined, 13,810), less difference in mill bins 500 tons; tons milled, 1,172,920; percentage of waste sorted out, nil; days milling, 347.710; tons milled per stamp per day, 8.433; average number of tube mills running, 11; days running, 343.304.

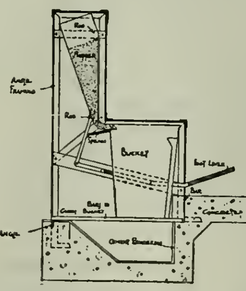
Details of Working Expenses.

	Totals. £	s.	d.	Cost per ton milled. s.	d.
Mining expenses	428,880	13	1	7	3.757
Development	27,368	19	8		5.600
Pumping	17,431	16	9		3.567
Transport of ore	20,306	10	6		4.155
Sorting and crushing	12,310	14	7		2.519
Milling	50,605	17	11		10.355
Tube milling	34,846	15	0		7.130
Sand expenses	38,738	18	7		7.927
Slime expenses	29,144	5	3		5.963
General charges	50,992	12	2		10.434
	£710,627	3	6	12	1.407
Expenditure on renewals and replacement of machinery and plant	3,011	6	7		.616
	£713,638	10	1	12	2.023

Water.—The water pumped from the mine during the year amounted to 116,573,830 gallons, an increase of 21,919,509 gallons, as compared with the previous year. *Development.*—The development footage for the year amounted to 8,607 feet. The following items of additions and/or renewals were either installed during the year or were in course of erection:—Sand-filling plant, additions to the foundations of sand tank supports, Lohse South Incline pumping plant; installing 6½in. by 8in. pump, 17th level Hammond; additional power transmission line to the Connor Shaft; plant for pumping slime over sand dump; a three-throw pump has been installed at the Witwatersrand Deep, Limited, for pumping East Rand Proprietary Mines, Limited, water to Knights Deep, Limited.

Improved Sanitation Underground on the Rand.

THE O'BRIEN IMPROVED PATENT DRY EARTH CLOSET SYSTEM.



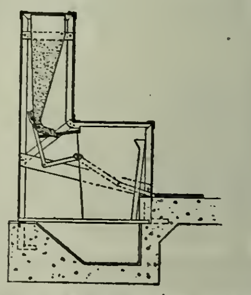
SECTION showing Hopper and Gearing in position of rest, or immediately after foot lever has been released.

The O'BRIEN Premier Dry Earth Closet System has undoubtedly proved itself to be the PREMIER of all dry earth systems, and only requires to be known on the mines to secure its general adoption.

THE PRINCIPLE OF THE SYSTEM IS THE SEPARATING OF THE LIQUID FROM THE SOLID OR FŒCAL MATTER, which is done by mechanism inside the pan. The Liquid is run into a chamber under or near the pan, which chamber is partly filled with a chemical absorbent preparation, and combining with the preparation thereby forms A PERFECTLY PURE, ODOURLESS SOLID, or by other means treated and allowed to flow away pure. The fœcal matter in the pan is automatically covered with a chemically prepared ash, rendering it absolutely odourless, and can be hoisted to the surface and carted away in open carts during the daytime.

The system itself is far superior to any other dry earth system, and has been largely ADOPTED BY THE SOUTH AFRICAN RAILWAYS and by the NEW SOUTH WALES GOVERNMENT FOR ALL BUILDINGS where no sewerage scheme is in use, also by MANY LEADING PUBLIC GENTLEMEN OF SOUTH AFRICA. In simplicity, cleanliness, and convenience it is far ahead of present practice.

Mr. DITCHFIELD will be happy to enter into Special Arrangements with Mines, Municipal and other Public Bodies, and, on application, will furnish estimates, and, if required, designs for the installation and maintenance of the system.



SECTION showing Hopper and Gearing in position while in use.

Original Testimonials received by us can be seen on application by anyone interested, at the offices,

Box 5408, Telephone No. 5649, JOHANNESBURG.

Mine Safety, Sanitation, and Welfare Bulletin.

Recent Accidents and their Lessons.

Fall of Ground Before Timber Arrives.

Four natives were killed in a Western Rand mine in the following circumstances:—With others, the deceased were employed under the supervision of a timberman in removing rails along a level in the oxidised zone, where the ground is creeping. The fall of ground which caused the accident was a piece of hanging 3 feet thick, shaped like a Gothic arch, the bow being formed by the two slips meeting. At the back was another smooth and soapy hanging-wall. The whole probably weighed 12 tons. It was clear from evidence that the timberman was aware that the ground was dangerous. All the natives declared that he told them so and advised them to desist from work until the ground was timbered up. But the natives were averse to this, being anxious to get through the day's work. The timberman, apparently against his better judgment, allowed them to continue, and before the timber arrived the ground fell.

Tube Mill Started with Mason and Natives Inside.

A native who was inside a tube mill when it was inadvertently put in motion was killed. The shaftsman in charge had taken off one cover and turned the tube mill a little in order to empty some of the contents. Meanwhile a fitter started unloosening end bolts. After the lunch hour a mason with three natives entered the mill, and started to fix a new end liner. Shortly afterwards, the shiftsman was asked by one of the fitter's natives to turn the mill a little, so that the bottom nuts could be reached. He did so, not knowing that the mason and his boys had entered the mill. One native was killed, whilst the mason and the other boys had miraculous escapes. Fortunately the mill was given only half a turn, otherwise they would all have been killed. It is a hard and fast rule that any mason before entering any tube mill should lock the switch controlling that mill, a padlock for the purpose being hung in the mason's shed. The mason in his eagerness to start and complete work by five o'clock omitted to take this precaution, though he was about to go and lock the switch when the accident occurred. The inspector who held the enquiry expressed the opinion that a better system would be to hold the shiftsman, who stops and starts the mills, responsible for the switches being locked during repairs. But whatever the system, the shiftsman should satisfy himself that no one is in the tube mill or working on it.

Timbering in a Colliery not Sufficiently Close to Face.

A native working in a colliery was severely injured by a stone slab which must have been quite ready to drop. Generally throughout the section the roof is bad, and all miners have instructions that timber must not be more than 6 feet from the face. In this instance it was 10 feet 6 inches from the face. Had the rule been carried out, and had there been another set of timber nearer the face, the accident would not have occurred. It was a marvel the native was not killed outright. The miner had been in the place just previous to the machine working unsatisfactorily, and had gone to attend to it. The place was then perfectly safe as far as could be judged by sounding the roof with the stick. He intended to timber the place when he had time.

Failure to Supervise Timbering.

On the morning following blasting a miner went through his stope and trimmed down the face and hanging. There was little trimming to do, but about 20 feet below the drive and adjoining a pillar there was a slab which he was unable to pinch down; five feet higher up there was another slab. Both were marked for timbering, and a timber boy was instructed to erect timber under the slabs. One stick was put in, but the bottom piece of rock came away, when the deceased native was measuring for the second piece of timber. The miner left the boys at work finishing the top stick, and went to his box to mark tickets. One of the timber boys was told to come to the miner on the drive below, and he would show him a stick for the second place. The mine captain in evidence pointed out that no work but the timbering of this place was going on at the time, and that no persons would have been endangered by the place being left until the miner had time to supervise the work. Regulation 106 (5) (a) requires the ganger or miner, among other things, to "personally supervise the removal or securing of all loose or loosened rock, mineral or ground which may endanger the safety of persons . . . . and shall not allow any workman who might be endangered thereby to proceed to such working place except such as are required to assist him in making the same safe, and then only when acting under his direct supervision."

Gassing Accidents.

First-Aid Suggestions.

Dr. Lewis G. Irvine, in a paper read before the Witwatersrand Branch of the British Medical Association (and published in the *Medical Journal of South Africa*) deals with accidents from poisonous and asphyxiating gases in mines, and proffers some suggestions on the treatment of such cases which will be useful to men on the mines. Carbon monoxide and nitrous fumes are the main active agents in causing gassing accidents. The former is practically invariably produced in dangerous quantities after ordinary blasting, and the latter is also not uncommonly present in dangerous amount, especially where there has been a partial burning of the explosive. In all cases of gas poisoning prompt and efficient first-aid treatment is of the first importance. The records, even of recent accidents, show that the practical knowledge of rescue and first-aid methods in these emergencies, amongst those employed underground, still leaves a good deal to be desired. This state of matters will, it is to be feared, continue, until all mine managers set themselves to make a well-equipped underground first-aid service part and parcel of the routine working organisation of the mine. Several of those attempting rescue, working with misdirected heroism, have in the past lost their lives, and many more have been temporarily overcome, through ignorance or heedlessness of the risks they have run, or sometimes from lack of the provision of adequate means of local ventilation.

Points to Remember.

Dr. Irvine says the following points are to be remembered in attempting rescue:—

1. When a gassing accident happens, the first thing to do is at once to turn on compressed air into the place in which it has occurred, and to keep it turned on throughout. This at once supplies those overcome with purer air, and makes it safer for rescuers to enter the danger zone. It seems an obvious precaution to take, but neglect to do so has not infrequently resulted in disaster to those attempting rescue, and in fatal delay in extricating those already overcome. No one should enter the danger zone until it has been well blown out for several minutes.

2. No man must enter the danger zone alone. Loss of life has occurred from this. Four men are the proper number to form a rescue party, so that if one is disabled the others may be able to help him. Men who have already been engaged in rescue work should not enter the danger zone a second time if fresh men are available.

3. Rescuers should carry with them one or two candles to test the air, and also electric lamps, or, failing these, acetylene lamps. Never take it for granted that the air is safe because candles continue to burn, but always regard it as an urgent danger signal if candles burn low or go out. If this happens, rescuers should at once withdraw, and wait until the place has been more thoroughly blown out, unless rescue can be effected immediately and easily.

4. The next thing to do is to bring the affected man as quickly as possible to the nearest place where the air is fresh, and then at once to attend to the breathing. To bring the man to the surface before commencing treatment will, in bad cases, give that treatment little chance of success, and in cases where artificial respiration is required the delay will render treatment hopeless. Yet this sort of thing still happens.

Reproduced from "The Reef."

MINING AND METALLURGY AT THE SAN FRANCISCO EXPOSITION.—I

The Rand Exhibits—Safety Devices—The Model Mine.*

THE centre of attraction for mining men at the San Francisco Exposition in the mining department is "The Mine," as sections of some of the greatest mines in the U.S.A. are represented. This excellent model mine was constructed under the supervision of the U. S. Bureau of Mines, in co-operation with the mining companies represented. The underground workings may be entered by an electrically-operated hoist, or by walking down the incline or slope. Mining men will feel at home as soon as they enter on account of the characteristic odours or decaying timbers and wet rock found in real mines. The excavation is below sea-level, but continuous pumping saves it from being flooded. In the small space occupied by the mine, the zealous student can learn more of underground mining from the exhibits and the courteous explanations of the white-capped young engineers than he could by months of hard study under the ablest of professors. Here are illustrated most of the methods and machinery used in coal and metal mines. As you descend the well-worn steps of the incline, you need light to illuminate the darkness, and there is a choice of electric, oil or acetylene safety-lamps, or an ordinary lamp. Should you need to resuscitate an asphyxiated person, the lungomotor is at your service. At your left, as you advance, is a Hercules powder-magazine with enough alleged dynamite to blow the whole building through the Golden Gate. The powder-magazine is not properly situated; in an actual mine it would not be in a cross-cut opening directly into a main gallery, but would be around at least two corners, so that the force of a possible explosion would expend itself on the rock-faces, and not on the unfortunate miners. A little beyond the powder-magazine the first real mining appears. This consists of a completely timbered stope from the Goldfield Consolidated Mine, in Nevada. Ore lies on the floor as if just broken. A small drill is ready to commence on a raise. Next comes a model of the system of mining in vogue at the renowed Homestake, in South Dakota, one of the world's greatest gold mines. It has paid 35,000,000 dollars in dividends, and yet there is 30 years' ore developed. At present the mills are crushing 4,500 tons of 4-dollar ore daily. This carefully made model, if correctly understood, conveys as much information as a good-sized volume on mining methods. It illustrates the working of a wide vein of low-grade ore by shrinkage-stoping. By a complexity of drifts and cross-cuts the 500 ft. wide zone of schist and quartz is divided into blocks 500 ft. wide, 60 ft. long, and 150 ft. high. This block is shot down in pieces up to 50 tons in weight for a height of 115 ft., and allowed to remain where it falls, without the use of timber. The 25 ft. separating this stope from the ground above is worked by means of square-sets, and then the whole stope is filled with waste. A mat of heavy timbers supports this waste and allows it to settle gradually. This is an admirable model and should be secured by one of our universities. Sample of ore and rock from the Homestake are also on view.

One would think that the Bunker Hill and Sullivan Company had bodily transferred one of its stopes from Idaho to the Exposition. The placing of this lead-silver ore (8 per cent. lead and 8 oz. silver) took a mining engineer and his assistant two months; the total expense of this small exhibit was 5,000 dollars. This reproduction of an actual working-face is excellent. The facility for artificially constructing an ore-body has often been used for fraudulent purposes in various parts of the world. In one case an expert found that the mine had been gutted behind an artificial wall a few feet thick; in another the perpetrators of the fraud were victims of their own lack of faith, as the would-be victims eventually found rich ore. This was in a noted silver-lead mine in Nevada, some 50 years ago. The Bunker Hill exhibit shows an ordinary waste-filled stope, a much commoner system than that of the Homestake. Among the photographs on the wall, those that show the wreck of the Wardner mill after it was dynamited on April 29, 1899, by a thousand or more miners who came on a captured railway train, and the photograph of the ill-famed "bull-pen" in which several hundred miners were subsequently imprisoned, should be of special interest to students of our industrial history. A Baldwin-Westinghouse storage battery (Edison) locomotive, hauling two 25-ton cars of ore just filled from a chute, is ready to pass out of the level. On the lower levels storage-batteries are used; trolleys appear in the main adit.

Copper men have their turn next at the Copper Queen Mine, Arizona. There a stope, ore-chute, man-way, timber-way, and timbering are shown; also faces of ore in place, slabs weighing a ton or more each being brought from Arizona. Specimens are exhibited of tenorite and melaconite in kaolin, chalcocite and pyrite, chalcopyrite and bornite, cuprite and malachite in iron oxide and kaolin. This exhibit cost 10,000 dollars. Iron mining is shown by workings of the Lincoln mine at the great Mesabi range, Minnesota. The black coal mines seem gloomy when contrasted with the bright ores of the Copper Queen. Reproductions of the anthracite mines of Pennsylvania and the bituminous mines of Kentucky, West Virginia, Wyoming, and Washington contain various coal-cutting machines, electric locomotives, drills, cars, safety-exit, man-way, automatic mine-door, and other appliances used in such mines. Between the metal and coal displays is a station where a motor-driven compressor supplies air for the drills, a centrifugal pump for draining the mine, a winze with sinking-pump and small hoist, and a Waugh drill, which occasionally bores a hole in a block of concrete. Fresh air from the surface is introduced at this station by a Sirocco fan working near the collar of the main shaft. A fuse magazine, a cap and fuse exhibit of the Ensign-Bickford Co., underground foreman's office, and a motion-picture theatre where actual mining scenes are shown, complete the workings. The fact that the Bureau of Mines has reduced the cost of producing radium to 36,050 dollars per grain of bromide will, perhaps, make a visit to the radium booths more interesting. At 2 p.m. each day, save Sunday, the mine crew of the Bureau gives an exhibition of rescue work and first-aid. A violent explosion occurs; protected by their Draeger helmets and store of oxygen, the rescuers enter a room full of poisonous gases, rescue a supposed victim of the explosion, resuscitate him by the most approved methods, and finally leave him in charge of a surgeon and nurses in the complete hospital near at hand. The Proto and Westphalia rescue apparatus are also ready for emergency.

(To be continued.)

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* From "Mining and Scientific Press."

Lonely Output

The particulars of the output of gold from the Lonely Mine for the months of September, 1915, are as follows:—Mill ran 658 hours; crushed 4,550 tons; yield of fine gold, 510.633 ozs.; value, £2,146 5s. 6d.; slimes treated, 4,550 tons; yield of fine gold, 2,025.100 ozs.; value, £8,513 15s. 11d.; total recovery of fine gold, 2,535,733 ozs.; total value, £10,660 1s. 5d.; estimated profit, £2,260.

Rezende Mines.

The results from the Rezende Mines, Ltd., operations for the month of September, 1915, were as follows: Estimated profit: Central section, £754; old west section, £190; total, £944.

Specimen copies of the *South African Mining Journal* can be had from our Agents, Argus South African Newspapers, Ltd., Byron House, 82-85, Fleet Street, London, E.C.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Another Big Order for Wire Ropes—Previous Tenders Rather Lower in Prices—Oil and Colour Review on Expert Authority—Shortage of S.A. Cement—Petrol and Paraffin Outlook.

The feature of the week on the Commercial Exchange has been that another group of mines has called for tenders for wire ropes. It is appropriate to record that the tenders received for the recent requisitions for some £100,000 worth of wire ropes for a big mining group reflected slightly lower values. The special significance of these lower rates has been much commented upon, as to whether they indicate more favourable war conditions for the Allies, or whether the British Government are requiring less wire ropes for rounding up the submarines, or again whether the pressure on the munition factories is not so great. But a wire rope agent would have none of these, as his explanation is that the smaller factories not commandeered by the British Government are making wire ropes and other mining materials; also it seems very evident that the Oversea journey has become much safer of late, as no South African boat has been sunk for some long while past, therefore the deliveries can be practically assured during the next few months. With this exception, business has been quiet, which is not surprising at this period of the month. The arrival of a mining magnate from England did give his group of shares a lift, which is proof that after all Johannesburg does love a magnate, notwithstanding all complaints to the contrary. However, outside of that, the time is not opportune for any magnate to put new life into mining matters until the war clouds begin to lift ever so little, when much is expected.

Oils, Paints, Lead, Glass, etc.

The following notes have been extracted from a circular letter recently sent out by a leading house in Johannesburg in the oil and colour trade:—

Genuine White Lead.—The price to-day is 52s. 6d. per 100 lbs., 51s. 6d. 500 lbs., and 50s. in ton lots. The price has advanced 10s. per ton in England during the last week. It is believed that white lead will reach very much higher prices on account of the enormous amount of raw pig lead being consumed by Britain.

Linseed Oil.—This market is also rising in England, and finished firm on Saturday last. The Johannesburg price is 22s. 6d. per five-gallon drum, but 24s. will no doubt soon be the price, as supplies from England are very erratic.

Colours in Oil.—Every mail brings advices of increased values and shortage of supplies. Reds, yellows and blues will be unobtainable shortly, except at greatly enhanced prices. Although present prices are the same as before the war, there will be an all-round advance in Johannesburg on Monday next, November 2nd.

Gold Leaf.—British advices say that very few men are left in this trade, and no hope can be held out for future supplies.

Aluminium Paint.—All supplies have been taken by the British Government for aeroplane wings, and although there is a little stock in Johannesburg, it cannot be replaced from Oversea unless at fabulous rates.

Oxide has risen twice in London, but no further advance has been reported recently.

Brushware.—Supplies are getting more difficult to procure each week. Orders placed in London in February last are not yet to hand. Higher prices are anticipated, and, further, it may not be a question of prices but whether supplies will be forthcoming in many lines.

Distempers.—Prices remain steady, and beyond not being able to procure deep reds, greens and blues, nothing much different is anticipated in the near future.

Turpentine.—Plenty of supplies seem available in America, but shortage of shipping, which means erratic arrivals, may tend to harden prices, coupled with higher freights and the rate of exchange.

Glass.—Makers being considerably handicapped owing to the shortage of labour, some difficulty is experienced in obtaining delivery. The present restricted shipping accommodation and a great number of glass-workers having joined the men at the Front, necessitates placing orders well in advance. Shipments of American window glass have come to hand, which is cheaper than the English make, but does not compare in quality.

Wallpapers.—The designs for 1916 have been selected and books will be ready about February next. Reds are scarce and prices rule much higher for them than in 1915.

Second-hand Material.

There has been more enquiry for diamond drills and the fittings, as well as spares for same, also there is a fair demand for 6 inch piping for lining boreholes in connection with diamond drilling. As regards piping there is quite a scarcity in the smaller sizes, ranging from ¾ inch to 3 inches. An extra good demand is in evidence for light tram fittings, such as fishplates, clutch bolts and small iron sleepers, not only throughout the Reef, but from outside districts, especially the coal mines. There has been a run upon lathes recently, not only from woodworking shops, but also from machine shops and foundries. It appears that there is a lot of work going on now throughout the various workshops in Johannesburg that was never thought of in pre-war days, under normal conditions, hence the brisk demand for lathes, particularly second-hand ones. The second-hand building material yards are increasing stocks, as the anticipated demand from the farming community after the elections has not yet come about. However, now the hub-hub is over, and the welcome rains are here, the farmers will have plenty to do on the land, and so long as prosperity seems likely the electioneering business will be left to the townspeople with their municipalities, which for the next fortnight seems to be lively, considering there are so many candidates.

Shortage of South African Cement.

A builder on Thursday urgently required five bags of cement to finish a job upon which his workmen were then engaged. As he could not obtain the cement from the firms with whom he usually deals, he asked a commercial broker

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to obtain same, with permission to pay as high as 10s. 6d. per bag, providing he could get immediate delivery. The broker considered he had fixed the deal, as one firm offered to accept 10s. 6d., but the delivery could not be arranged at once, although an offer to pay extra for the cartage did not bring forth the desired result; therefore the matter had to be dropped. However, on the morrow the five bags were secured from another firm at the recognised standard rate of 8s. 3d. These details are mentioned to emphasise the fact that cement has been very scarce in town on account of so much being sent recently to Capetown Harbour for the Government works there. Nevertheless, from information obtained from the sales office, it is so far satisfactory to state that a fairly large consignment left Pretoria for Johannesburg at the end of this week, which will relieve the acute position. It was also ascertained that decent weekly consignments at least will be sent in future to Johannesburg and the Reef.

Petrol and Paraffin.

Petrol is a very uncertain market, and the recent advance is no criterion that it will stop there. A dealer states that it is difficult to get anything like a favourable contract ahead, as the large importing companies are in as much a quandary as the smaller men as to the trend of the market. However, the consensus of opinion is that prices for petrol and paraffin will certainly advance than otherwise. The shipping freight seems ever on the increase, as well as other charges, that those concerned do not expect any relief in values until after the war. In the meantime very fair stocks are held in Johannesburg, but the cable information is studied more carefully than ever as a guide to holders, who seem altogether disinclined to book anything like a big line forward from their own local stocks.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; mild steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; nuts, ⅜ in., 7½d. per lb.; ½ in., 45s. per 100 lbs.; then up to 1½ in., 37s. 6d. per 100 lbs.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7½d. to 7¾d., 11 ft. 8¼d., 12 ft. 8¾d.: 26 gauge, 6 ft. to 8 ft. 6d., 9 ft. 6¼d.. 10 ft. 6½d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d.; over, 9½d. (Oregon, 8 7-16d.); flooring, 4½ x ⅞ and 6 x ⅞, 4⅜d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 35s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 21s. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 43s. 6d. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; carbon lamps, 7s. 6d. per doz.; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British opal glass shades, 21s. to 24s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

INVESTORS' DIARY.

FORTHCOMING COMPANY MEETINGS.

Oct. 29.—Knights Deep.
Nov. 3.—Rand Klip.
Nov. 9.—Johannesburg Consolidated Investment Co.
Nov. 19.—Glynn's Lydenburg.
November 26.—Cons. Main Reef Mines: Main Reef West.
November 30.—Transvaal and Delagoa Bay Investment Company.
6th December.—Zaaiplaats Tin Company.

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The Week's Meetings.

ROOIBERG MINERALS.

A TRYING YEAR.

Strong Financial Position.

Development and Ore Reserves.

The annual meeting of shareholders of the Rooiberg Minerals Development Company, Ltd., was held in the board-room, National Bank Bldgs. on October 27. Colonel W. Dalrymple presided, and the others present were Messrs. A. G. Gill, W. McCallum, J. Munro, W. J. Gau, L Rosenthal, B. H. Davis, W. H. B. Frank, J. A. P. Gibb, M. C. A. Meischke, A. W. Bannerman, F. E Scriveu, E. J. Way (consulting engineer), G. W. Austin (transfer secretary) and L. S. Raymond (secretary).

The Chairman proposed the adoption of the report, and this was seconded by Mr. McCallum and agreed to. Mr. Gau was re-elected to the directorate, and Messrs. Alex Aiken and Carter were reappointed auditors.

In moving the adoption of the report and accounts covering the operations of the company for the year ended 30th June, 1915, the chairman said: I wish to deal first with the accounts, and then give you a general resume of the operations of the company, and an outline of its position to-day. In the balance sheet you will notice that the form in which the accounts are presented to you has been slightly modified, and the amounts which previously stood to the credit of "premium on shares" and "funds transferred from appropriation account," have been applied towards depreciation of the capital assets of the company.

A Critical Period.

An amount of £5,000 has been added to the reserve fund, bringing this fund, together with interest, to £20,850. Up to the present your directors have found it unnecessary to touch this fund, but there is no doubt that its existence gave to the affairs of the company, during the critical times through which we passed when the war first broke out, and the metal markets were closed, a stability which otherwise would have been wanting; and, at a later date, when conditions as regards shipment and sale had become more secure, the board was able to recommend with confidence the development of the mine, which had been suspended since the outbreak of war.

In the profit and loss account, it will be seen that there is a large falling off of the gross revenue, as compared with that for the year ended 30th June, 1914. This is partly due to a decrease of 239 tons of concentrates produced, and also to a reduction of £23 in the average price of metallic tin, on which our sales were based. The average prices obtained for tin for the last four years have been £197, £218, £174, and this last year £151. Expenditure, when compared with the previous year's figures, shows a considerable reduction, due mainly to the fact that practically no development was done for about eight months; and, as you know, all development is charged off monthly to working costs. The net profit for the year amounted to £29,803, which, together with sundry revenue £122, and the balance brought forward from last year, £22,787, makes a total of £52,712. This has been dealt with as follows:—Dividends Nos. 8 and 9, totalling 12½ per cent., £22,500; amount appropriated to meet capital expenditure for the year, £8,292; Government taxes, £308; directors' remuneration on declaration of dividends, in terms of articles of association, £1,125; amount transferred to reserve fund, £5,000; balance carried forward, £15,487; making a total of £52,712. Details of the capital expenditure are as follows: Alterations and additions to power plant, £741; married quarters, £159; No. 2 spruit dam, £7,314; sundries, £78; total, £8,292. The expenditure on capital account for the current year will include provision for the installation of bituminous coal gas producers, at an estimated cost of £4,000; a small hydraulic plant for treating alluvial deposits, at an estimated cost of £2,600; and the addition of four single and one double-decked Deister tables to the slimes plant, at an estimated cost of £1,600.

New Plant.

Dealing first with the bituminous gas producer, the present method of power production is by means of charcoal, and this is becoming more difficult to obtain, as the supplies of suitable timber in the district of the mine are becoming exhausted. A gas producing plant consuming bituminous coal is in operation in this country, and from what we can gather is proving very efficient; and, after full consideration, your board decided to embark on the expenditure necessary to instal a plant of this description of a capacity suitable to your requirements. At a meeting held in this room on the 29th October, 1913, I referred at considerable length to the question of alluvial deposits, and to the erection of a sluicing plant for extracting tin therefrom. Last year I pointed out that, while it did not appear likely that the process would pay for itself—in so far as the actual tin directly recovered was concerned—it was considered that this method of exposing the rock and thus revealing any pockets of ore and fissures which make their way to the surface would be so far in advance of the present method of excavating and baring the country rock by native labour, that the cost of the plant would soon be recovered indirectly if not directly. It was with this in view that your board decided to construct a second dam, to which reference was made last year, and which has now been completed; and in anticipation of the dam being filled in the early part of the next rainy season, it was thought advisable to take the necessary steps to go forward quietly and erect a small sluicing plant. The Deister tables will be installed to augment the slimes plant. I will refer to this matter again later.

Reduced Reserves.

I have already referred to the fact that, following on the declaration of war, development work was practically suspended for approximately eight months. This naturally had an adverse effect on the position of the ore reserves. Further, your manager draws attention in his report to the fact that the supplementary fillings in the lower levels are neither so large nor so numerous as those found nearer the surface. As therefore the tonnage obtained from the supplementary fillings lessened, so was it necessary to draw more largely from the recognised ore reserves. For the eight months referred to the total development done represented only about as much as is done in one month under normal conditions; and over the whole financial year only 2,936 feet of development work were driven in the northern and east end old workings, compared with 10,119 feet driven during the preceding year. The effect of this was naturally a comparatively rapid diminution in the ore reserves, which will take time to replace. In the northern and east end old workings the reserves at the 30th June last were estimated at 13,714 tons, with an average contents of 4 per cent. metallic tin, as compared with 20,097 tons, averaging 4.95 per cent. metallic tin at the end of the previous financial year. The stock of ore at grass was 3,516 tons, of an assay value of 6.3 per cent. metallic tin, as compared with 4,292 tons, valued at 8.2 per cent. metallic tin. In addition, there were 1,000 tons of ore estimated to contain 4.5 per cent. metallic tin, at the south end and intermediate workings. The accumulated middlings and slimes for retreatment stood at 7,975 tons of an average assay value of 2.5 per cent. metallic tin. I must here again remind you that the figures of ore reserves in the mine are, at best, only a very approximate estimate. While, for reasons I have just given, this reserve is considerably below that for last year, I do not think that shareholders need take a pessimistic view of our position at date. It is true that since we recommenced development operations we have been unable to make up the leeway which resulted from the suspension of development in the early part of the financial year, but all our experience in the exploration of this mine has gone to prove that while the work of driving may give purely negative results it is usually found in the subsequent exploration of the ground blocked out by drives that patches of payable ore are located.

A Year's Operations.

The total tonnage mined for the year was 24,836 tons. The waste sorted out was 2,141 tons, equal to 8.62 per cent. of the ore mined. In addition, 3,638 tons were milled from the prospecting dumps. Accumulated middlings and slimes re-treated amounted to 10,873 tons, and the total tons milled were 37,263. The average grade sent to mill, including middlings and slimes re-treated, was 2.82 per cent. metallic tin, compared with 3.181 per cent. for the previous year, and the quantity of black tin was 1,055 long tons, of an average grade of 69.28 per-cent., compared with 1,294 tons, averaging 68.51 per cent. metallic tin. Extraction for the year was 78.27 per cent., compared with 78.81 per cent.; working revenue per ton was £2 18s. 7d., compared with £3 15s. 3d; working costs were £2 2s. 7d. per ton, compared with £2 7s. 9d.; working profit being 16s. per ton, compared with £1 7s. 6d.

It will be seen by reference to the consulting engineer's report that, as compared with the work of the old plant, the percentage of recovery has increased from 57.97 per cent. in 1911-1912, to 78.27 per cent. for the year now under consideration; the figure for 1913-1914 being slightly in excess of this. While it may justly be claimed that this is a very satisfactory achievement indeed, on the old basis of extraction and at present prices, our gross profit on the year's work would have been reduced to some £5,000, yet with residues containing anything between 0.45 per cent. and 0.87 per cent. metallic tin, it must be confessed that we have not yet reached perfection in our method of extraction, and this is a matter which is having our constant attention, but it all means substantial capital expenditure. I previously referred to the intention to instal further Deister tables. Experience has shown that, as the mine increases in depth, the tin contained in the ore is finer, especially in the Union Lode, which is our present principal source of production, and there is a higher percentage of pyrites; this fact increases the difficulty of extraction, and the existing slimes plant is unable to recover some of this fine tin. You have been previously informed that the percentage of extraction is very largely dependent upon the size of the plant; and compared with similar plants in other countries, the slimes equipment is small. We have now reached the position that, to maintain our previous high-water mark of extraction, we are compelled to provide a further increase of plant to treat the slimes. As regards the future, our technical advisers inform us that a higher rate of extraction can only be obtained by further addition of devices for concentrating, and if the position of the ore reserves warrants it, we must be prepared to still further increase this section of our plant.

Fight Near the Mine.

In the latter part of last wet season, the abnormal rains brought on a recurrence of malarial fever, from which the district has been comparatively free for the last few years. This resulted in an increase in native mortality in the district; not so much on the mine, where medical attendance was available, and every effort made to combat the mosquito, as in the native kraals, and it affected the supply of native labour, and rendered it necessary for the company to turn to the Native Recruiting Corporation for a few boys. These were mostly supplied from the Northern Transvaal, and our action has undoubtedly served to advertise the mine among the natives in the districts whence they were drawn. The supply of labour is now ample for our requirements. In the report issued to shareholders by the board, for the quarter ended 31st December, 1914, a brief account of the engagement which took place near the mine, between the Government forces and a rebel commando in November last, was given. I do not think it necessary further to touch on this matter, but I think shareholders may congratulate themselves on the good services rendered to the Government, by the employes and the ladies on the mine, and to the fact that practically no interruption to the work of the company was caused. It is regrettable that one of the company's employes, Mr. Hitchcock, lost his life whilst assisting the Government forces. Although it is not a matter which concerns the operations of the company, I think that a word may here be said for the generous support given by the employes of the company to the various patriotic funds which have been started in connection with the war. In the last 14 months the employes of the Rooiberg Company, through voluntary deductions from their wages, have contributed £541 2s. 3d., to these funds, made up as follows:—

Governor-General's Fund ..	£141	4	8
Belgian Widows and Orphans' Fund	176	0	8
Prince of Wales's Fund ..	156	0	2
Comforts for Troops	30	0	0
Hospital Ship	37	16	9

For such a small community as we have on the mine I think you will agree with me that this is an excellent record.

Employes Fully Paid.

Last year I stated that all wages and fees had been reduced to half owing to the uncertainty of disposing of our product. You will be pleased to learn that the board has since been able to pay in full for the whole period. Four of your employes, including the medical officer, have been granted leave on half pay, to go on active service Oversea. Although the price of tin ruling during the past year has so seriously affected the financial results of your operations as regards the prospects of your mining and exploratory work we have no reason to be despondent, in fact quite the contrary: and, thanks to the shareholders supporting the action of the Board in building up a reserve fund, your company is in a sound position, and fairly well protected against the possibility of sustained adverse conditions generally. Taking all the adverse circumstances into consideration, attributable more particularly to the war and the rebellion, we must be satisfied with the results of the year's operations. Messrs. E. Friedlander and W. J. Gau retire from the Board, in terms of the company's articles of association, and Mr. Friedlander does not seek re-election. He has taken this course owing to his long continued residence in England and I take this opportunity of expressing the Board's appreciation of the services rendered by him during the time that he was actively interested in the affairs of the company, and regret that he is no longer able to associate himself with our company. No nominations have been put forward by the shareholders for filling this seat, hence the question of filling the vacancy on the board caused by Mr. Friedlander's retirement will receive the early attention of the board. In conclusion, I should like to express the hearty appreciation of the Board for the loyal services rendered to the company by Mr. E. J Way, your consulting engineer; Mr. E. R. Schoch, your manager, and the staff. I now move that the report and accounts before you be adopted, and that the action of the directors in declaring interim dividends Nos. 8 and 9 during the year be approved

EAST RAND MINING ESTATES.

Development on Neighbouring Properties.

The ordinary general meeting of the East Rand Mining Estates, Ltd., was held on Sept. 29 at Winchester House, E.C., Mr. Charles F. Rowsell (the Chairman) presiding.

The Chairman, in moving the adoption of the report and accounts, said:—There is very little change in the balance sheet as compared with last year, but you will see that our cash on deposit has increased from £61,550 to £67,250, while the loan to the Grootvlei Proprietary Mines—which we regard as a perfectly good one—is increased from £13,813 to £15,354. Turning to the profit and loss account, you will see that the receipts for the year ended 30th June, 1915, exceeded the outgoings by £3,692 18s. 10d., which substantially decreases the debit standing to profit and loss account—now reduced to only £1,306. We received for interest £3,128 and for farm revenue £2,406. This latter figure will indicate to you that our land is of considerable value, independent of its value from the purely mining point of view. I think that, considering the period through which we have passed, the fact that our expenses have been easily met and an appreciable surplus carried to profit and loss account is a matter upon which we may congratulate ourselves. When I addressed you last year I dealt briefly with the effect of the war upon securities in general, and I ventured to prophesy that the investing public would be impressed by the solidity of Rand mining investments, which had been so noticeable during the war period to that date, and that we might look for some improvement in the market in consequence. I certainly did not then myself appreciate that this improvement would take place so soon; but it is a fact that the market in those shares which are interested in the Far Eastern Rand has enjoyed a—comparatively—exceptional period of prosperity since our last meeting. This is not altogether due, however, to general causes, but rather to the specific fact that developments in that district have been extremely interesting and, from our point of view, very satisfactory. I have on more than one occasion pointed out that we must look to the development of the adjoining properties for some estimate of the value of our assets. It is clear that these assets can only be brought to the producing stage and their intrinsic values made apparent after considerable expenditure has been incurred; but in the meantime all the developments taking place upon adjoining properties go to demonstrate very conclusively the great possibilities of the area in which you are interested.

RECENT RESULTS AT GEDULD AND SPRINGS MINES.

At our last meeting I drew your attention particularly to the results obtained by one or two of our neighbours, and to-day I would more particularly draw your attention to the recent results achieved by the Geduld Proprietary Mines and the Springs Mines, both of which immediately adjoin the Grootvlei property. On the 31st December last the Geduld Proprietary had developed 1,900,000 tons of ore of an average value of 30s. 2d. over 59½ins. and during the year crushing proceeded at a profit of 7s. 11d. per ton. The Springs Mines—which is really the nearest property to our Grootvlei property—had developed 553,000 tons at that date of a value of 43s. 9d. over 52ins.—an extremely satisfactory result, and one which compares more than favourably with the result of every mine which has been developed in the Transvaal. The Daggafontein, which adjoins our property on the south, has proved the reef in its shaft at a depth of 3,570 feet, giving a value of 8dwts. over 40ins. Experience on the Rand generally confirms the view that one may fairly estimate one's values by the consideration of the results secured on adjoining properties. Values on the Rand are very regularly distributed, and when you have—as in our case—proved the existence of the reefs of the same series upon your property as those being worked on the adjoining properties, the results attained by them may be relied upon as a guide with considerable assurance. It might be well, perhaps, to remind you of the fact that the area owned by the East Rand Mining Estates, directly or indirectly—that is to say, through its share interests in the Grootvlei Proprietary Mines and its interest in Palmietkuilen—is equal to 2,268 mining claims, or about ten times the area of an average mine on the Rand. Our former consulting engineer, Dr. Hatch, estimated the ore contents per claim at about 17,000 tons. On this basis, after deducting a margin of 25 per cent., we should have ore contents for the whole area of about 34,000,000 tons. I only quote these figures to give you some slight idea of the enormous possibilities of your property and to assure you that they have amply sufficient attraction to justify the provision of all the capital required when a suitable time arrives for carrying out so large a financial operation. In conclusion, I can only again express the hope that before I next have the pleasure of meeting you the war will have ended in victory for our country and its allies, and that once again we shall enter upon a time of financial activity, rendering it possible to undertake the raising of the necessary capital for the development and equipment of the great properties in which you are interested. (Hear, hear.)

Mr. C. Guy Pym seconded the motion, which was carried unanimously, and the retiring directors and auditors were re-elected

New Patents.

252. Charles Henry Perrins.—Improvements in and relating to the recovery of tin from scrap metal.
253. Seguin Fisher.—Improvements in water-fed rock drills.
254. Archibald Clark and Alfred Hilton Edwards.—An improved clamp for the fingers of stamp mills.
255. James Conolly.—A process for the reduction of steel or other metal scrap in the foundry cupola.
256. Joseph Peitu.—Buckskin coat.
257. William Hanton Mortimer.—Improvements in and relating to machines for the manufacture of cupels.
258. Albert Frain.—Improved fittings for ox yoke.

New Registrations.

4675. Scantlebury's Garage and Motor Company, Limited, corner Fox and Delvers Streets, Johannesburg: capital, £100 (private company).
4676. Pretoria Investment Company, Limited, 20, Aegis Buildings, Loveday Street, Johannesburg; capital, £500 (private company).
4677. Mahomed Cassim Coovadia and Company, Limited, 41, Market Street, Johannesburg; capital £2,500 (private company).
4679. Union Estates, Limited, 6, Palace Buildings, Rissik Street, Johannesburg; capital, £100,000 (private company).
4680. The Close Settlement Corporation, Limited, 12, Trust Buildings Fox Street, Johannesburg; capital, £2,000 (private company).
4681. Noordelike Drukpers Maatskappij Beperk, No. 23, Alexandra Buildings, Church Square, Pretoria; capital, £30,000.
4682. The Mercantile General Agency, Limited, 3, Gresham Buildings, Commissioner Street, Johannesburg; capital, £100 (private company).
4683. Provident Estates Corporation, Limited, 22 23, Natal Buildings, Commissioner Street, Johannesburg: capital, £750 (private company).
4684. I. E. Nava, Limited, Stand 1018, corner Commissioner and Dingaan Streets, Krugersdorp; capital, £500 (private company).
4685. Nana and Son, Limited, Stand 335, Eleventh Street, Vrededorp; capital, £1,000 (private company).
4686. Abdul Carrim Osman, Limited, 78, Market Street, Lydenburg; capital £200 (private company).
4687. Rawene, Limited, Chadleigh's Buildings, Eloff Street, Johannesburg; capital, £1,500 (private company).
4688. A. H. Vally, Limited, Erf 97, Kerk Street, Ermelo; capital, £1,000 (private company).
4689. G. W. Shilling and Company, Limited, 447, Church Street East, Pretoria; capital, £1,000 (private company).
4690. The Industrial Commercial and Land Agency, Limited, No. 1, Pritchard Street, Johannesburg; capital, £1,000 (private company).
4691. Walter Wilkinson, Limited, 1st Floor, Dowell Buildings, Loveday Street, Johannesburg; capital, £6,500 (private company).
4692. Osman Omar, Limited, 126, Prinsloo Street, Pretoria; capital, £1,500 (private company).
4693. The Mac Mac Estates, Limited, "Mac Mac," Pilgrim's Rest, Transvaal; capital, £12,000 (private company).
4694. John Macaulay, Limited, 2, Breda Chambers, Rissik Street, Johannesburg; capital, £200 (private company).
4695. Cottage, Limited, 12, Rissik Street, corner Market Street, Johannesburg; capital, £1,500 (private company).
4696. Sidat, Limited, Erf 131, Market Street, Bloemhof; capital, £700 (private company).
4697. Platkoppies Syndicate, Limited, 9, Ginsberg Chambers, Johannesburg; capital, £1,500 (private company).
4698. Amod Moosa Bhyat, Limited, 71, Commissioner Street, Johannesburg; capital, £2,000 (private company).
4699. Dadabhoy, Limited, 24, Market Street, Johannesburg; capital, £5,000 (private company).

FOREIGN COMPANIES.

4678 Compound Diamond Mining Syndicate, Limited, care of William Enoch John Clarke, 12, Saner's Buildings, corner Market and Loveday Street, Johannesburg; capital, £2,000.

ADDITIONS AND ALTERATIONS TO FOREIGN COMPANIES

3336. The Oceana Consolidated Company, Limited, Johannesburg.
3397. Rand Ricksha, Limited, Johannesburg.

For Sale.

Three pair Holman Pneumatic Stamps, No. 1 size, complete. Pair undertype Robey Winders, 14½" Cylinders, Boiler 100 lbs.

Pair modern Horizontal Winding Engines, drop valves, Cylinders 22" by 48" stroke, Drums 8' diameter, Wellman Friction Clutch for high speed and high pressure. Several Air Compressors from 100 feet to 1,100 feet per minute. Whole of the above plant, second hand, but in fine condition, recommended. Enquiries solicited for all kinds of Mining, Contractor's and Works Plant. Very large stocks for immediate delivery, low prices. Wagons, Rolling stock of every description.

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Engineering Notes and News.

Irrigation in the Union.

LIST OF PRINCIPAL WORKS IN PROGRESS.

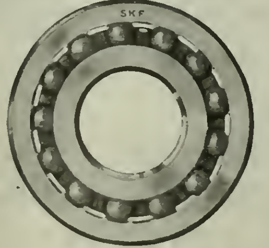
The following particulars in regard to irrigation works are published as being of general interest, particularly to persons in search of employment. The Director of Irrigation considers that items Nos. 4, 8 and 10 on the schedule will probably not be completed under eighteen months, and the remainder not under six months:—

1. Klipdrift, Irrigation Works, Loopspruit, Potchefstroom, Transvaal; earthen dam and canals—Government works being built by contract and departmentally under Government supervision.
2. Klerksdorp Irrigation Board, Schoonspruit, Potchefstroom, Transvaal; earthen dam—works being constructed by Irrigation Board under Government supervision.
3. Maraisburg Irrigation Board, Vlekpoort River, Maraisburg, Cape; weir and canal—works being constructed by Irrigation Board under Government supervision.
4. Prins. River Irrigation Board, Ladismith, Cape; weir and storage reservoir—works being constructed by Irrigation Board under Government supervision.
5. Rademeyer Irrigation Board, Gamtoos River, Humansdorp, Cape; weir and canal—works being constructed by Irrigation Board under Government supervision.
6. Baroda Irrigation Board, Fish River, Cradock, Cape; weir and canal—works being constructed by Irrigation Board under Government supervision.
7. Duivenhoks River Irrigation Board, Swellendam, Cape; weir and canal—works being constructed by Irrigation Board under Government supervision.
8. Calitzdorp Irrigation Board, Nels River, Calitzdorp, Oudtshoorn Division, Cape; concreme dam and canals—works being constructed by Irrigation Board under Government supervision.
9. Reenen Irrigation Board, Gamtoos River, Humansdorp, Cape; weir and canal—works being constructed by Irrigation Board under Government supervison.
10. Olifants River Irrigation Board, Clanwilliam, Cape; weir and canal—works being constructed by Government for Irrigation Board.

Use for Worn Tube-Mill Liner Bars.

The following paper by Mr. J. M. Dixon was read by Mr. W. R. Dowling at a recent meeting of the Chemical, Metallurgical and Mining Society: In these days of scarcity of material and rising prices, the following notes on further methods of obtaining uses for worn out tube-mill liners of the Osborn type are submitted in the hope that other suggestions for economy on similar lines may be forthcoming. Launder lining.—In the coarse crushing plants endless expense is caused by the excessive wear of launders, and the writer has found relief in employing discarded tube-mill bars for this purpose. The bars are selected to a more or less uniform size and are set in cement, the thickest ends being placed at the lower end of the stream to avoid splash. If insufficient time is available to allow the cement to set, the liner should be completely covered with belting or other suitable material, to afford protection for some days. Battery Bins.—The wearing faces of battery bins can be covered with worn bars set on end and held in position either by staples or by cross pieces bolted to the bin. Battery Feeder Chutes, when lined by laying discarded bars cut to suitable lengths side by side, and wedging with wood (cement need not be used) give no further trouble. The use of steel bars for lining bins and chutes is by no means novel, and the foregoing remarks rather indicate a new source of supply. It may be, however, claimed that the use of worn tube-mill liner bars as liners to the stamp-mill mortar box is new. Mortar Box Lining.—Trials made of using this waste material to line the backs of mortar boxes have given very good results. A close selection of bars has to be made in order to get a more or less uniform and suitable thickness. The bars when cut to the desired lengths are bevelled, the bevel corresponding to that of the end liners, and when placed horizontally in the box are held in position by the end liners, small wedges of hard wood being driven in to complete the lock. Nine to twelve pieces form the back liner, according to type of box, and those receiving most of the wear are easily replaced by pinching up the top pieces and changing only those worn out. The top and bottom sections are available for three or four liners. The metal left in a cast steel liner is considerably greater than that actually worn away, but the casting nevertheless must be discarded because it does not form a complete protection to the box. These bar liners give quite a good life and when compared with imported manganese steel at 5d. to 6d. per lb. a considerable saving is effected, the cost of cutting on a mine being practically negligible.

"SKEFKO"



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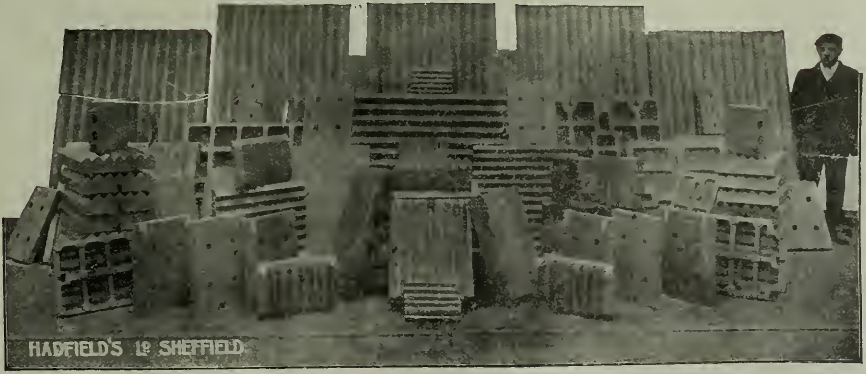

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The Rooiberg Minerals Development Co., Ltd.

(Incorporated in the Transvaal.)

DIRECTORS' REPORT

Submitted at the Seventh Ordinary General Meeting of Shareholders held in the Board Room, National Bank Buildings, Simmonds Street, Johannesburg, on Wednesday, the 27th day of October, 1915, at 10 a.m.

GENTLEMEN,

Your Directors beg to submit their Report, together with audited Statements of Account for the year ended 30th June, 1915.

The Reports of the Consulting Engineer and the Manager are also attached.

CAPITAL.

The Capital of the Company is £180,000, divided into 180,000 shares of the nominal value of £1 each, all issued, and fully paid.

PROPERTY.

The Property of the Company consists of :

(a) The freehold—including Mineral Rights—of the southern half of the Olievenbosch No. 939, District Rustenburg, this portion being in extent 971 morgen 141 square roods.

(b) The freehold—including Mineral Rights—of the adjoining farm Hartebeestfontein No. 310, in extent 3,186 morgen 320 square roods. The surface rights of one morgen of this Farm have been transferred to the Government for buildings for educational purposes.

OPERATIONS.

The following are the results of the year's operations :

Number of Stamps	10	
Number of days (24 hours) Concentrating Plant ran	339.71	
Ore Mined	24,836	tons.
Ore taken from Stock in Bins	57	,,
Ore taken from Prospecting Dumps	3,638	,,
Waste sorted out (8.62 per cent.)	2,141	,,
Ore Milled	26,390	,,
Sands and Slimes re-treated	10,873	,,
Total treated	37,263	,,

Concentrates produced 1,055 long tons of an average grade of 69.28 per cent. metallic tin.

It is estimated that there were on hand at 30th June, 7.975 tons of accumulated slimes, middlings, etc., of an average assay value of 2.5 per cent. metallic tin.

The Water Storage Reservoir and Boreholes have provided an ample supply of water.

Since the close of the rainy season a second Water Storage Reservoir, capable of holding 50,000,000 gallons, has been completed. The total storage capacity of the two Reservoirs is estimated at 100,000,000 gallons.

FINANCIAL.

The Revenue from Tin Concentrates amounted to £109,249 9s. 1d.; the expenditure on Working Account was £79,446 9s. 2d. The Working Profit for the year was thus £29,802 19s. 11d. A further £121 13s. 4d. was derived from Interest, etc., making a gross profit of £29,924 13s. 3d., which, together with £22,787 8s. 8d., brought forward from last year, was dealt with as follows :

	£	s.	d.
Interim Dividends Nos. 8 and 9 of 5 per cent. and 7½ per cent. respectively	£22,500	0	0
Expenditure on Improvements	8,292	10	3
Directors' Special Remuneration	1,125	0	0
Government Taxes	308	3	10
Reserve Fund	5,000	0	0
Carried forward	15,486	7	10
	£52,712	1	11

An amount of £5,000 has been added to the Reserve Fund; including interest earned, the amount set aside for this Fund now totals £20,850.

All expenditure upon Development and Exploration, amounting to £12,693 8s. 8d., has been charged to Working Costs.

The average price of metallic tin, on which the sales of concentrates for the year were effected, was £151, as compared with an average of £171 for the previous year.

DIVIDENDS.

Interim Dividends Nos. 8 and 9 of 5 per cent. and 7½ per cent. respectively have been declared during the year.

DIRECTORS.

In terms of the Articles of Association, Messrs. E. Friedlander and W. J. Gau retire from the Board. Mr. E. Friedlander, having taken up his residence in England, does not seek re-election. Mr. Gau is eligible and offers himself for re-election.

AUDITOR.

You will be asked to fix the remuneration of the retiring Auditor, Messrs. Alex. Aiken and Carter, and to appoint an Auditor for the ensuing year.

WM. DALRYMPLE,
WM. McCALLUM,
J. ROY,
B. H. DAVIS,
W. J. GAU,
JOHN MUNRO,
Directors.

Johannesburg, 31st August, 1915.

APPROPRIATION ACCOUNT.

Dr.	£ s. d.	Cr.	£ s. d.
To Dividend No. 8 of 5 per cent.	£9,000 0 0	By Balance, 30th June, 1914	£22,787 8 8
,, Dividend No. 9 of 7½ per cent.	13,500 0 0	,, Balance Profit and Loss Account	28,491 9 5
,, Expenditure on Improvements	8,292 10 3		
,, Amount Transferred to Reserve Fund	5,000 0 0		
,, Balance to Balance Sheet	15,486 7 10		
	£51,278 18 1		£51,278 18 1

The Rooiberg Minerals Development Co., Ltd.—continued.

BALANCE SHEET, 30th June, 1915.

Dr.

To Capital Account ... ... 180,000 Shares of £1 each.		£180,000 0 0
		180,000 0 0
.. Reserve Fund ...		20,850 0 0
As per Balance Sheet, 30th June, 1914 ...	£15,350 0 0	
Amount appropriated as Interest	500 0 0	
Amount transferred at 30th June, 1915 ...	5,000 0 0	
,, Sundry Creditors ...		19.626 14 2
Sundry Shareholders for Dividend No. 9 ...	13.500 0 0	
Unclaimed Dividends ...	63 11 5	
Estimated amount due to Government for Profits and Income Taxes ...	251 11 1	
On Open Account, including Charges in Advance ...	5 811 11 8	
,, Appropriation Account ... Balance at 30th June, 1915.		15.186 7 10
CONTINGENT LIABILITIES: There are further Contingent Liabilities, as under:—		
Witwatersrand Native Labour Association, Ltd.— 50 Shares, 8s. per Share uncalled	£20 0 0	
Native Recruiting Corporation, Ltd.— Balance of Deposit on a complement of 775 Natives at 12s. 6d. ...	484 7 6	
	£504 7 6	
		£235,963 2 0

Cr.

By Property and Equipment ...			£180,000 0 0
As per Balance Sheet, 30th June, 1914 ...		£220,326 10 0	
Less amounts written off, represented by:			
Premium on Shares as per Balance Sheet, 30th June, 1914 ...	£15.000 0 0		
Funds Transferred from Appropriation Account, 30th June, 1914 ...	25,326 10 0	40.326 10 0	
			£180.000 0 0
.. Shares in other Companies...			386 2 6
Witwatersrand Native Labour Association, Ltd ... 50 Shares, 12s. per Share paid and 25s. per Share deposit.		92 10 0	
Native Recruiting Corporation, Ltd. ... 3 Shares, and deposit.		293 12 6	
.. Furniture ...			529 13 10
., Live Stock and Vehicles ...			728 1 8
., Stores on Hand ...			6,484 13 11
,, Sundry Debtors and Payments in Advance ...			746 10 4
,, Concentrates in Transit ... Less Advances received against same.			12,865 11 9
., Cash ...			31.222 5 0
Reserve Fund, as per contra ...		20,850 0 0	
Fixed Deposits with Accrued Interest, Current Accounts, and in hand ...		13,372 5 0	
			£235,963 2 0

PROFIT AND LOSS ACCOUNT for Year ended 30th June, 1915.

Dr.

To Mining ...		£12.867 18 6
.. Transport, Sorting and Crushing		2.349 7 4
.. Milling and Concentrating ...		20.582 11 2
., Drying and Bagging ...		3.470 1 11
,, General Expenditure—Mine ...		7.283 3 6
,, Slimes Experiments Expenses ...		673 5 8
., Development and Exploration ...		12.693 8 8
,, General Charges—Head and London Offices ...		4.989 13 2
,, Realisation Charges ... Transport, Railage, Freight, Insurance and Returning Charges.		14.536 19 3
.. Balance carried down ...		29.802 19 11
		£109.249 9 1
,, Government Taxes ...		£308 3 10
Estimated Amount of Tax on Profits and IncomeTax for year...	£251 11 1	
Amount of Taxes under-estimated for 1914 ...	56 12 9	
,, Directors' Special Remuneration... In terms of Articles of Association.		1.125 0 0
,, Balance to Appropriation Account		28.491 9 5
		£29.924 13 3

Cr.

By Concentrates Account	£109.249 9 1
	£109.249 9 1
.. Balance brought down ...	£29.802 19 11
.. Sundry Revenue ...	121 13 4
	£29,924 13 3

L. S. RAYMOND, Secretary.

WM. DALRYMPLE, Chairman.
WM. McCALLUM, Director.

AUDITOR'S REPORT.

To the Shareholders,
The Rooiberg Minerals Development Co., Ltd.

We have audited the above Balance Sheet with the Books and Vouchers of the Company, for the year ended 30th June, 1915. We have obtained all the information and explanations we have required, and have to report that in our opinion the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the Company's affairs, according to the best of our information and the explanations given us and as shown by the books of the Company.

Johannesburg, 31st August, 1915.

ALEX. AIKEN & CARTER, Auditor.

Consolidated Main Reef Mines & Estate, Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Seventeenth Ordinary General Meeting of Shareholders in the above-named Company will be held in the Board Room, Cullinan Building, Johannesburg, **on Friday, the 26th November, 1915, at 11 a.m.**

Business:

1. To receive the Directors' Report and Financial Statements for the year ended 30th June, 1915.
2. To elect Directors in the place of the present Board, all of whom retire, but, being eligible, offer themselves for re-election.
3. To appoint Auditors in the place of Messrs. J. P. O'Reilly and A. Aiken and Carter, and to fix their remuneration for past services.
4. To transact any other business which may be transacted at an Ordinary General Meeting, or which may be brought under the consideration of the Meeting by the Report of the Directors.

The London Share Transfer Registers of the Company will be closed from the 1st to the 6th November, 1915, both days inclusive, and the Head Transfer Registers of the Company will be closed from the 22nd November to the 10th December, 1915, both days inclusive.

Holders of Share Warrants to Bearer desiring to vote must deposit their Warrants at the Head Office of the Company, Johannesburg, at least twenty-four hours before such General Meeting, or at the London Office, Salisbury House, London Wall, on or before the 4th November, 1915, together with a statement in writing of the name and address of the Holder of the Warrants, in exchange for which a certificate will be given entitling the Holder to attend and vote at the Meeting in respect of the shares specified in such certificate.

By Order of the Board,
A. GREGOR, Acting Secretary.

Head Office: Johannesburg,
July 29th, 1915.

MAIN REEF WEST, LIMITED.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Fourteenth Ordinary General Meeting of Shareholders in the above-named Company will be held in the Board Room, Cullinan Building, Johannesburg, **on Friday, the 26th November, 1915, at 11.30 a.m.**

Business:

1. To receive the Directors' Report and Financial Statements for the year ended 30th June, 1915.
2. To elect Directors in the place of the present Board, all of whom retire, but being eligble, offer themselves for re-election.
3. To appoint Auditors in the place of Messrs. H. Hains and Fraser and Mackenzie, and to fix their remuneration for past services.
4. To transact any other business which may be transacted at an Ordinary General Meeting, or which may be brought under the consideration of the Meeting by the Report of the Directors.

The London Share Transfers of the Company will be closed from the 1st to the 6th November, 1915, both days inclusive, and the Head Office Transfer Registers of the Company will be closed from the 22nd November to the 10th December, 1915, both days inclusive.

Holders of Share Warrants to Bearer desiring to vote must deposit their Warrants at the Head Office of the Company, Johannesburg, at least twenty-four hours before such General Meeting, or at the London Office, Salisbury House, London Wall, on or before the 4th November, 1915, together with a statement in writing of the name and address of the Holder of the Warrants, in exchange for which a certificate will be given entitling the Holder to attend and vote at the Meeting in respect of the shares specified in such certificate.

By Order of the Board.
A. GREGOR, Acting Secretary.

Head Office: Johannesburg,
July 29th, 1915.

The National Bank of South Africa,
LIMITED.

INTERIM DIVIDEND.

NOTICE IS HEREBY GIVEN that an Interim Dividend at the rate of Six per cent per annum has been declared for the half-year ended 30th SEPTEMBER, 1915, being Six Shillings per Share.

The Dividend will be payable on 25th NOVEMBER next to all Shareholders registered in the Books of the Company at close of business on 30th INSTANT, and to holders of Coupon 34 attached to Share Warrants to Bearer,

The Transfer Books of the Company will be closed from 1st to 6th NOVEMBER next inclusive.

Dividend Warrants, payable to Registered Shareholders in South Africa, will be posted from Pretoria as soon as possible after receipt from the London Office, by whom they will be issued.

Holders of Share Warrants to Bearer are informed that Coupons may be deposited at any of the Bank's Branches and will, upon verification by Head Office, be paid on or after 25th NOVEMBER next.

By Order of the Board of Directors.
C. P. MATHEWS,
Secretary.

Pretoria, 21st October, 1915.

JOHN RICH,
OFFICES AND STORES:—
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JOHANNESBURG.
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THE SOUTH AFRICAN
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NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 1½d.

CONTENTS. PAGE

Notes and News 215

Topics of the Week:

The Mining Outlook 217
Tin and Copper Prices 218
The Excess Profits Tax 218

The War and the Diamond Industry 219
Valuation of Gold Mining Shares 220
Renewed Activity on the Klein Letaba Goldfields ... 221
"T.C.L." Mining and Prospecting Activity 221
Phthisis Prevention Committee's Special Report ... 222
Progress on Albu Mines 223
Correspondence and Discussion: "The Outlook for Tin"; "The New Metallurgy" 224
Union Mining Statistics for September 225

Rhodesian Section:

Rhodesian Mineral Output for September 226

The Week in the Mining Material and Engineering Trades 230

Company Meetings:

Knights Deep; Western Rand Estates 234
Sakalava Oils; Rand Klip, Ltd. 235

Engineering Notes and News:

Preparation of Large Type Boilers for Test—II. ... 236

Notes and News.

Cold Fields Report. The Consolidated Gold Fields of South Africa, Ltd., have received the following cable from their London office regarding the company's operations for the financial year ended 30th June, 1915:—"The realised profit on the year's operations is mainly derived from dividends received on investments and after deducting debenture interest and all outgoings shows a balance to credit of £299,151 17s. 5d. (against £388,067 for 1913-14), from which the dividends on the first and second preference shares and French Government taxes have been provided, leaving £145,616 6s. 1d. (as against £131,091 for 1913-14), which added to the sum of £84,471 15s. 2d. brought forward from last year leaves £230,088 1s. 3d. (as against £193,607 for 1913-14). The board of directors recommend that a cash dividend of 7½ per cent. free of income tax be paid on the 2,000,000 ordinary shares, amounting to £150,000, leaving £80,088 1s. 3d. to be placed to the credit of current year's profit and loss account."

* * * *

The New Telephone Directory. The appearance of a new telephone directory is not in the usual course a matter that would call for comment in these columns. The fact, however, that the latest guide to telephone users fairly bristles with mistakes of omission and commission, and mistakes, furthermore, that affect several of the leading mining material and financial firms of the Rand, makes it incumbent on us to enter a protest. Absolute accuracy in all that pertains to telephone numbers is, of course, an essential of modern everyday business, and it is not too much to say that the errors already brought to our notice by leading firms will, unless at once corrected, quickly reduce their business to chaos and confusion. The issue of mere belated correcting slips is powerless in the matter. The only thing for the Post Office authorities to do is to recall its latest compilation at once, and replace it as soon as possible with a corrected work. The remedy may seem expensive and heroic, but the blunder cannot otherwise be retrieved.

* * * *

Phthisis Prevention Report. Elsewhere in this issue we print some extracts from the Special Report of the Phthisis Prevention Committee, which reaches us as we go to press. The moral of the whole seems to be that the disease can be stamped out provided the known preventive measures be strictly enforced. All efforts must, therefore, be concentrated upon that side of the matter; and we may expect to see, as the first result of the report, a marked tightening up in the methods of those responsible both to themselves and others for the stringent observance of the mining regulations.

* * * *

British Shops and Mining Machinery. There is a mistaken impression in some quarters that the present rush of work in connection with war material in the engineering shops is seriously limiting the manufacture in England of mining machinery. The actual position is that the Ministry of Munitions has rightly considered that the production of metals, especially gold, is one of the industries that is of direct importance in the present conduct of the war, and in the future commercial recovery of the Empire. As a consequence of this view, the *Mining Magazine* says, the authorities look sympathetically on such manufacture of mining machinery as is necessary, even by controlled shops; and so far there has been no difficulty in placing orders in Great Britain for all regular mining requirements. In fact, the stoppage of orders to Germany has led to an increase in certain supply lines for England; and manufacturers there are of course desirous of keeping the trade, particularly with a view to the future needs of their shops when war work is at an end.

Munitions Manufacture Conference.

The conference called by the Union Government to consider in what way and how far South Africa can assist the Imperial Government by the manufacture of munitions of war opened this week in the Board Room of the S.A.R. Offices at Park Station. Mr. Hoy, General Manager of Railways, presided over an attendance of some 70 or 80 delegates from all over the Union—Johannesburg, Pretoria, Capetown, Kimberley, Bloemfontein, Port Elizabeth, East London, Durban, Maritzburg, and other towns. The conference is being held in private.

* * * *

Development in the Far East.

At the meeting of the Rand Klip on Wednesday last, Col. Dalrymple, the Chairman, drew attention to the special importance of development in the Far East Rand area. "There is no system of pay shoots to be followed," he remarked, "but patches—often covering large areas—must be searched for." This is a circumstance that makes the provision of abundant capital for those areas, as compared with the more regularly enriched mines of the Central Rand, a matter of the gravest necessity. It may be doubted whether the Government has fully appreciated this fact in its schemes relating to the unopened blocks of ground beyond Boksburg. The difficulty of obtaining capital even for promising claims in that district, apart from war troubles, is sufficiently evidenced by the failure of Daggafontein to get beyond the shaft sinking and equipment stage.

* * * *

The Dumb-Bell Tube Mill.

Full patents for Great Britain have now been granted to Messrs. G. A. & D. Robertson, for their invention, "The Bumb-Bell Tube Mill." It will be remembered that this mill on a small working scale was exhibited at the last Mining Exhibition held under the auspices of the Chemical, Metallurgical and Mining Society. Experiments with this mill have since been conducted on the property of the May Consolidated Gold Mining Company. A stream of pulp from five stamps crushing through screens as coarse as a half-inch mesh has been bye-passed for experimental purposes. We hope shortly to publish the results.

* * * *

Carolina Asbestos.

The directors' report and accounts for the year ended 30th September, 1915, to be submitted at the general meeting of shareholders of the Carolina Asbestos Company, Ltd., to be held on Friday, 17th December, shows that the property comprises all the rights to asbestos on the farm Diepgezit, No. 33, in the district of Carolina, together with facilities for working the same. The property still remains on lease, but no work of any description was done by the lessee during the year. The expenditure for the year amounted to £13 0s. 3d., and this amount has been added to the amount standing to the debit of income and expenditure account at 30th September, 1914, which amount now stands at £3,993 19s. 1d.

* * * *

South African Investment Trust.

A rather poor showing is made by the report of the South African and General Investment and Trust Company for the year ended 30th June last, which has just been issued. The net profits, after payment of debenture interest, amounted to £17,200, as compared with £20,000 in the previous twelve months, and at the same time provision had to be made for a loss of £4,300 on realisation of properties in Johannesburg and for £1,300 expended on repairs and alterations of the Trust buildings, in order to enable the company to accept certain shipping agencies. The dividend on the ordinary shares is consequently reduced from 5 to 3 per cent., and a balance of £1,400 is carried forward, as compared with £1,800 brought into the accounts.

* * * *

Read's Drift Land.

The annual general meeting of the Read's Drift Land Company, Ltd., was held in London in mail week. Mr. S. H. M. Killik presided, and moved the adoption of the report for the year 1914, which stated that the value of live stock depreciated considerably, thus necessitating the writing down of the company's stock to meet the altered conditions. The loss thus occasioned accounted mainly for the unfavourable result of the year's working, which showed a loss of £7,307. The report was adopted.

* * * *

Appeal for Economy of Gold.

An Imperial Treasury communication says:—"As you are no doubt aware, a public notice was issued by the Treasury at the beginning of August last calling attention to the importance, with a view to strengthening the gold reserves of the country, of substituting notes for gold for the purpose of paying wages and for cash disbursements generally. The public response to this request has, on the whole, been excellent, and the Treasury is glad to be able to acknowledge the patriotic spirit in which employers generally, often at serious inconvenience to themselves, have adapted their arrangements to meeting the wishes of the Government. It appears, however, that some employers are still applying to the banks for gold coin for the purposes of wages payments, and if this practice continues there is danger that those who are now assisting the policy of the Government may be discouraged in their efforts. The Treasury therefore desire to impress upon you the great importance, from the point of view of national interests, of maintaining the instructions which they trust you have already given to your cashiers to discontinue the use of gold coin for wages payments altogether, or should such instructions not already have been given, of your giving them immediately."

* * * *

Glynn's Lydenburg Annual Report.

The annual report of the directors of the Glynn's Lydenburg, Ltd., states that the net profit for the year amounted to £34,905 12s., to which must be added the sum of £34,440 14s. 2d. brought forward from last financial year and unclaimed dividends written back, £1 8s. 3d., making a total of £69,347 14s. 5d. This has been dealt with as follows:—Government taxes, £5,465 6s.; dividends Nos. 27 and 28 (20 per cent.), £34,000; expenditure on property and equipment, £1,069 17s. 7d.; balance carried forward, £28,812 10s. 10d. The disastrous floods of January and February seriously interrupted and hampered operations in all directions, development work in the Werf Mynpacht being at a standstill for practically three months owing to the flooding of the workings. Ore reserves show a considerable increase of tonnage to 65,000 tons, but the estimated value has decreased from 10 dwts. over 12·3 inches as at July 31, 1914, to 8·4 dwts. over 11·8 inches as at July 31, 1915. The decrease in value is due to the lower value of reef exposures in the Werf Mynpacht during the year. Only slow progress has been made with the increased power plant. The floods of January and February caused a complete cessation of the work on the weir in the Sabie River for some months. Work was resumed towards the close of the financial year, and satisfactory progress is now being made. In consequence of the war the new machinery has been delayed and it will probably not be available for erection for some little time.

* * * *

Globe and Phoenix.

At the meeting held on April 27 last the Chairman of the Globe and Phoenix stated that "as to litigation, it is not, I think, desirable to add a word to what appears in the printed report, and pending the trial we do not propose to give any further detailed reports even of the monthly developments." Up to December 31 last £6,000 per month had been regularly set aside as a reserve for the litigation in respect of the John Bull claims, and the total sum then stood at £30,000. This process has been steadily proceeding, and the directors now announce that they have deposited with the company's bankers the sum of £84,000 in cash to await the result of the litigation, and that, therefore, they do not propose to make any distribution at present. For 1914 the company paid 6s. per share and on account of the current year 1s. was paid in July. Should the company succeed in its action against the Amalgamated Properties of Rhodesia this sum will be released. It may be noted that the dividend represents the distribution of £40,000.

World Supplies of Potash. A valuable pamphlet has lately been issued by the Imperial Institute, which gives a complete review of the available sources of potash—a product so important now as an artificial manure, and employed so extensively in glass manufacture and numerous other industries carried on at home and in the Dominions. The bulk of the commercial needs of this and other countries have hitherto been supplied by the enormous deposits of potash salts which occur near Stassfurt in the north of Germany—a source no longer available. It has become necessary accordingly to take stock of other sources of supply with an eye to the possibilities of the future. Only one other natural extensive deposit exists (in Spanish Catalonia). This, so the pamphlet informs us, is now beginning to be worked, and under the circumstances has a distinctly favourable outlook. India has deposits which "may prove to be of importance if they can be cheaply worked." So far as the Empire is concerned, however, more may be anticipated by the utilisation of timber resources, agricultural residues, and by-products of industries in which vegetable materials are employed. Wool washings, which were used for the purpose of procuring potash compounds in Belgium, France, and Germany, offer themselves as a source in several parts of the Empire. Extraction of potash from burnt seaweed (as in the case of Scotch kelp) and from marine plants, and from sea water should be possible over a wide area. The advantage of using for this purpose hedge cuttings and refuse of timber clearances has lately been recommended by the Board of Agriculture, and may in some measure be of assistance to farmers of the United Kingdom. Similarly "these sources are of especial importance in many parts of the British tropics where the ashes of wood and various plants are now almost the only source of potash available for manurial purposes." The production of potash from kelp and other vegetable sources is under serious consideration in several districts of the home country.

* * * *

The Standard Bank. For the half-year ended June 30 the directors of the Standard Bank of South Africa, Ltd., as already announced, are paying an interim dividend of 7s. per share, being at the rate of 14 per cent. per annum, which is the same as that paid for the corresponding six months of 1914. The bank's statement, which has just been issued, discloses a strong position. On the one side, deposit, current and other accounts, including profit and loss account, stand at £24,761,236 as against £21,560,485, and drafts outstanding and acceptances under credits at £1,009,991, against £1,058,381; while on the other, cash in hand has gone up from £3,791,562 to £4,640,146: cash at bankers and at call and short notice from £2,846,059 to £3,722,244; and investments, which now include the War Loan, from £2,643,335 to £3,132,032. Bills discounted and advances to customers have also risen from £12,664,701 to £14,539,449, but bills of exchange have fallen from £4,038,595 to £3,045,371. The reserve fund still remains at £2,000,000, while the notes in circulation amount to £1,221,080, or £151,846 more than a year ago. It will be seen that some of the items show considerable improvement, from which it is evident that this important institution has been able to more than hold its own during a very unsettled period.

* * * *

Caika Cold. A larger tonnage was treated by the Gaika during the quarter ended June 30 than for the preceding three months; but as working costs increased by 5d., to 27s., per ton, and the value of the bullion recovered was lower by 1s. 11d. per ton, at 47s. 2d., the profit shows a reduction of 2s. 4d., at 20s. 2d. Development work was principally confined to the Main Reef in the No. 2 and No. 4 levels in the north section. In the former the length of the pay shute was extended 40 ft., to 585 ft., and the average width increased from 26 to 28 in., while the value was 1 dwt. better at 25·07 dwts. In the No. 4 level the reef has been exposed for 605 ft., an advance of 95 ft.; but although the width has shrunk fractionally, to 46 in., the value has improved by no less than 3·10 dwts., to 11·60 dwts. The ore reserves amount to 95,570 tons of the value of 14·14 dwts., as compared with 100,770 tons valued at 14·62 dwts. twelve months previously.

TOPICS OF THE WEEK.

THE MINING OUTLOOK.

The mining industry enters upon the penultimate month of the year under excellent auspices. The October output promises to prove a record-breaker; labour is abundant, and the prices of supplies are no worse, if no better, than before. The fact that South African gold shares are in ever-increasing demand, both in this country and in London, is, in the circumstances, not surprising. Without "pressing," or the slightest attempt at "picking the eyes" out of the mines, the rate of gold production has been increased each month; records made and broken, and the gold supply of the Empire steadily augmented. The fact, of course, is not being lost upon the world of finance and industry. Mr. Asquith, in his reassuring speech this week dwelt with justifiable pride on the fact that London had maintained its free gold market, and it is not for us to say to what extent the Rand has helped in that desirable consummation. The position of the mines was never better, and the merits of the industry as a stable field of investment have, of course, been given an advertisement as unique as it is thoroughly deserved. At the important annual meeting of the Johannesburg Consolidated Investment Company, Ltd., next Tuesday, a very satisfactory statement will doubtless be laid before the shareholders, and it is, we believe, no secret that Mr. S. B. Joel, who is now visiting the Rand, has been agreeably surprised at the wonderful progress and stability of the industry and of the place. The strong native labour position, of course, is largely responsible for the improvement on the mines At the recent meeting of the Native Recruiting Corporation, it will be remembered, the Chairman drew attention to the gratifying manner in which the number of natives recruited by the corporation had increased. In the year to 30th June, 94,295 natives were recruited, an average of 7,858 per month, against 60,092 and 5,008 in the preceding twelve months. At the end of June the general average percentage of underground complement employed by the mines was 78·7 per cent., against 70·55 per cent. a year previously. That percentage had continued to increase, and at the end of September stood at practically 90 per cent. That unique position was no doubt due to a combination of circumstances, in which the absence of industrial unrest, poor seasons in native territories, and, to a lesser extent, the war and the consequent closure of the diamond mines, all formed part.

Though the outlook for the producing mines is thus excellent, the immediate prospects of new development are less rosy. Parliament meets in a few weeks, its membership reinforced by the accession of able and prominent mining men but in high official circles it is not expected that mining legislation will find any place in its activities. Without new legislation, of course, nothing can be done with regard to the undeveloped areas of the Far East Rand. The Government must be acquitted of any desire unduly to delay expansion in that district. The fact is, that in the circumstances it is not considered possible to raise capital in London for gold mining exploitation—strong though the arguments may be in favour of such a step. Everything must, as a fact, be postponed to the successful termination of the war; and the Government, as may be gathered from the speeches of Generals Botha and Smuts, will concentrate all efforts to that end. Keenly desirous as we all are to see the beginning of a move made with the Far East areas, it is difficult to find fault with the decision of the Government. First things first: and the removal of the German flag from Africa is assuredly the most clamant call of the moment. Nor is it likely that the re-starting of the diamond mines will much precede increased activity on the Far East Rand. Vast quantities of stones have doubtless been accumulated in recent years of production; and the controllers of that industry would be well advised to work them off before again setting the machinery of the diamond mines in motion. The informative and authoritative review of the diamond trade from the pen of Mr. George F. Kunz, printed in another part of this issue throws an instructive light on the situation in the chief market for the stones. On the whole, therefore, we must be content with the measure of success that is attending the mining industry in this testing time. A success so real and so unexpected must surely mean that when the pressure of present world-events is relieved and the industry is encouraged to expand, its attractions and possibilities are bound to outweigh, in the eyes of the investor, the influence of the many restrictive factors which the economic pundits foretell will follow the cessation of the war.

TIN AND COPPER PRICES.

Both tin and copper enjoyed notable advances in price this week, and the causes will repay investigation. On the London Metal Exchange on Monday standard copper closed at £75 5s. per ton; electrolytic copper, £89 per ton. Copper advanced on an active demand owing to the influence of the American advices. Straits tin closed at £163 10s. per ton for cash, and £162 15s. per ton for three months' delivery on an American demand and the scarcity of tonnage at the Straits. Of course, so long as the war continues deranging the ordinary machinery of commerce, nobody need be surprised by erratic conditions in the metal markets, especially those of international character, like the copper market. The violent fluctuations in the rates of exchange have greatly increased the element of gambling in selling American copper for delivery abroad. The difference in price due to this was a feature in the recent dull market. Producers were stiff in their attitude toward domestic buyers, but were willing to take less from foreign buyers. Of course, about half of the American domestic production of copper has got to be sold abroad anyhow. The *Engineering and Mining Journal* says there have been three prices for copper of late, on an ascending scale—namely, the price to European buyers, the price to domestic consumers, and the Wall Street price. The last has been pretty steady at 18c. per lb., although there have been threats that it might go to 20c. It is noteworthy that the strike of copper miners in the Clifton-Morenci district has turned out to be serious, the several mines and smelteries having been formally put in the hands of the sheriff. Elsewhere among the copper mines there has been remarkable peace and contentment. The bitter strike at Lake Superior and the amusing affair at Butte cleared the atmosphere. The policy of paying the men on a sliding scale corresponding to the price for copper, introduced in many districts, has proved a good one. It is a simple and satisfactory system of profit-sharing, which makes the men feel that they are partners in the business. "It is believed among producers that the domestic manufacturers of copper goods are bound to cover large requirements for copper during the last quarter of the year. The matter of freight rates and freight space for shipments of metal from the United States to European ports is causing a good deal of concern among shippers." Doubtless the explanation of the present rise lies in the advent of the delayed demand of domestic manufacturers, mentioned above.

Turning to tin we find the *Statist* describing the movement of prices for some time past as the subject of considerable disappointment, even in quarters where a rather conservative attitude is usually adopted regarding the market position and prospects, and at present there is rather a sharp cleavage of opinion as to the probabilities of the near future. On the one hand there are those whose opinion is not lightly to be disregarded, who talk of much lower prices being experienced, while on the other there is a not unimportant section of the trade which inclines to the belief that a substantial recovery is due. As against the market there seem to be certain valid arguments, and these, notwithstanding the fact that present costs of production show a considerable appreciation upon those ruling at the beginning of last year, and that American consumption is exceedingly large. The speculative character of the tin market has always been one of its most attractive features to those who have made it a hobby, but since the war broke out it has almost entirely lost this characteristic, for not only is the Continental market practically a dead letter with the closing of Germany and Austria, but there has been a notable diminution of interest shown by America. The cause of the last named is undoubtedly to be sought in the conditions laid down by the British Government for regulating the supplies of tin of British origin reaching the United States. By these regulations tin can only be shipped to America, when it is consigned to certain British Consuls, and such metal will only be released on signed guarantees that the tin will be used by the recipient for his own industrial purposes, and will not be exported. Furthermore, the effects of the war, and also the regulations just referred to, have tended to prevent importers and others carrying stocks of tin in America. On the other hand, there are a number of considerations which normally should work for higher prices. It is pointed out that the total supplies of tin from August 1, 1914, to August 31, 1915, compared with the previous 13 months, show a very considerable reduction. The monthly average of supplies has fallen from 7,790 tons in 1913-14 to 7,130 tons in the following period, and the reduction applies to all sources of supply. It is probable that the serious fall in the price sustained during the first part of last year has affected the output of the higher cost properties, while financial disturbances arising from causes connected with the war have also played a part. Production under existing circumstances can hardly be expected to increase, although a substantial and sustained recovery in prices would no doubt induce the development of mining propositions which have been rendered idle through the war. America is now making preparations to supply a portion of her own requirements by smelting Bolivian ores, but developments in this direction are bound to move slowly, for the reason that the United States tin-smelting industry is hardly likely to assume much importance for some time to come.

THE EXCESS PROFITS TAX.

The Chancellor of the Imperial Exchequer on the occasion of the introduction of the Budget stated:—"It is proposed to introduce a special tax in respect of profits which have increased during the war period. The tax is to extend to all trades, manufactures, concerns in the nature of trade and businesses, including agencies, whose profits for any business year of account ending on any date between September 1, 1914, and July 1, 1915, exceeded the profits on the income tax assessment by more than £100." The method of calculating the excess profit is illustrated in the instance given by Mr. G. A. Touche, M.P., in the House of Commons on September 28. A manufacturing concern makes the following profits:—Year to December 31: 1911, £15,000; 1912, £20,000; 1913, £30,000; total, £65,000. The average of the three years to be taken for assessment for the year 1914-15 is, therefore, £21,600. The earned profits for the year to December 31, 1914, being £35,000, such profits coming in a year ending between the defined period, September 1, 1914, and July 1, 1915, the excess profit taxable would be £13,400, less the £100 allowed, and the 50 per cent. tax would therefore be £6,650. In reply to a question, the Chancellor stated that this tax would apply to English companies working gold and other mines abroad. Most important mining companies are, however, Colonial or foreign registered. Of the important gold-producing companies of the Rand the bulk are registered in the Transvaal, and we take it the new tax would not apply to them, as they have already to bear the taxation of the country of their registration. Among the few that are English-registered are the Van Ryn, Village Main Reef, and Durban Roodepoort. The first is fairly important, the second is nearing the end of its life, while the third, with a short life, is not of great consequence. It has been stated that an allowance will be made for "obsolescence," and presumably these, and all other mining companies coming within the scope of the Act, supposing they earned excess profits, would be taxed, with due regard to life considerations. Of investment companies holding the shares of Rand mining companies, the *Statist* reminds us that a number are registered in England, including the Anglo-French Exploration, Central Mining and Investment, Consolidated Mines Selection, Consolidated Gold Fields and several companies of similar character associated with it. Among the investment companies which are Transvaal-registered are the Rand Mines, Johannesburg Consolidated, and A. Goerz & Co.

THE WAR AND THE DIAMOND INDUSTRY.

Authoritative Review and History of the Condition of the Trade Since the War.

[By George F. Kunz.][*]

The seven months of the year 1914 until the declaration of war showed a condition that seemed favourable to improvement in the precious-stone industry. Then the stagnation resulting from the war completely changed the whole aspect of affairs in a very short space of time. This was mainly due to the almost entire cessation of any demand from the European countries, as well as to a much modified consumption on the part of the United States. The demoralisation reached its height with the fall of Antwerp and the complete cessation of the diamond-cutting industry there, which before the war equalled if not slightly exceeded in volume that of the mother of this industry, Amsterdam. Then the fact that many of those engaged in the commerce of precious stones in England and France were of German or Austrian origin, or had names that indicated their race, caused the closing of their places, the proprietors being compelled to flee or be interned in the respective countries in which they had lived. By a strange coincidence, many of the Hebrews left for Portugal where the diamond-cutting industry of the eighteenth century was so prosperous, and whence they had been driven to Holland through religious persecution.

Secondly, the calling to the colours of a considerable number of men in the profession by the countries at war, has of course seriously hampered many establishments, making it impossible to carry on business as it was formerly done. Moreover, in Germany, there was the difficulty of shipping goods to the outer world from Oldenburg, Hanau, and other places, as well as from the Bohemian region where the cutting of gem stones has flourished. Even when shipments were made by way of Holland, or by way of Sweden, this meant delays, additional expense, risks, and interferences with a well-organised commerce.

In spite of these many drawbacks, however, the demand for the better class of stones is still sufficient to maintain prices, a result due in some degree, of course, to the diminished output. The diamond in its finer qualities is receiving more appreciation than ever. Sapphires may be said to be enjoying royal favour, and fine emeralds are quite as much in vogue as ever before. There has been an increased working of the American gem mines in Montana, and hence the production of American gem stones has been quite as great as in any previous year. The intrinsic value of pearls has been demonstrated by the maintenance of their value even at a time when almost the entire world had declared a moratorium. Here the notable falling off in the supply from some of the principal fisheries has for some time past operated to keep prices at a high level. Among the more recent designs for bringing out the beauty and effectiveness of precious stones may be noted the use of a tint of black along the edges of the stone; for instance, a tiny mortised or mitred edging to the centre of diamonds, or other gems, this onyx effect being used very successfully in many cases. Rock crystal engraved and encrusted with a delicate tracery in some dull colour, or surrounded by small diamonds in attractive grouping and setting has been used to a great extent. The prevailing favour accorded to block tints for costume and accessories by the feminine world, in the autumn and winter seasons at least, may be assumed to have some connection with the prevalence of mourning in Europe, for woman's invincible tendency to emphasise the element of daintiness and beauty wherever possible has been displayed in the more graceful and even artistic and stylish effects recently given to mourning garments, in marked contrast to the more severe and even unlovely fashions of former days. A novel form of bordering for emeralds, rubies, or saphires, consists of the adjustment at the sides of a square-cut coloured stone, of four narrow, oblong, table-cut diamonds, each one of these entending along one of the sides of the central coloured stone. The contrasting effect is very striking and beautiful, as the diamond material is in much closer and more intimate contact with that of the central stone than is the case where the latter is surrounded by a cluster of small faceted diamonds.

Markets and Imports.

The following official figures giving the total imports of precious stones for the years ending June 30, 1911-1914, show the falling off in the year 1914, before the European war affected the market, due to the higher tariff rates, which become operative after October 3, 1913. While there was a slowing up during the first seven months of the year, the decisive effect of the war is shown by comparing the total for the first six months with that for the last six months, the figures being, respectively, 13,558,722 dollars and 6,206,265 dollars, of which latter amount 2,160,161 dollars represents imports for the month of July before the beginning of hostilities.

In the last seven months of the year (January-July, inclusive), when trade in precious stones is least active, the average monthly imports were 2,245,550 dollars, while in the last five months (August-December), during which period the largest importations are usually made, the monthly average had fallen to 809.221 dollars, not 40 per cent. of that of the former months, and probably part of this represented the filling of orders given prior to the declaration of war. The fact that the value of the imports for February, 1915, was nearly 2,000,000 dollars (1,884,903 dollars)—almost double the figures for the previous month, 1,035,917 dollars—shows the strong tendency to recovery even in the midst of the war, and gives us an indication of the rapid increase sure to follow the conclusion of peace. The special degree in which the diamond trade of Amsterdam has suffered since the beginning of the war is clearly brought out in the comparative figures of exports from Amsterdam to the United States in 1913 and 1914. While the totals of all exports show a falling off of 2,367,542 dollars in the last-named year as compared with the previous one, the decrease in diamond exports alone largely exceeded this, being 5,465,484 dollars. The respective figures for 1913 and 1914 as invoiced at the United States consulate are as follows:[†]

	1913. Dollars.	1914. Dollars.
Cut	10,085,701	5,157,838
Uncut	985,161	447,540
	11,070,862	5,605,378

The immediate effects of the war are more strikingly shown in the following statement, giving the exports to the United States for the first seven months and the last five months of the two years respectively, the heavy exports in the early part of 1913 being, of course, largely due to the impending increase in tariff rates.

	1913.		1914.	
	Jan.-July. Dollars.	Aug.-Dec. Dollars.	Jan.-July. Dollars.	Aug.-Dec. Dollars.
Uncut diamonds	728.057	257,104	278.833	168,707
Cut diamonds	7.900,426	2.185.275	4,497,216	660,622
	8,628,483	2,442,379	4,776,049	829,329

Although the exports for the closing five months of 1914, covering the war-period of that year, show a decrease of two-thirds in the value of cut and uncut diamonds sent from the port of Amsterdam to the United States, the stagnant condition of the local diamond industry might have led us to expect an even greater falling off; however, the still considerable amount of diamond material exported during this time is stated to have been partly due to a supply brought in by fugitive diamond dealers from Antwerp, who were forced to sell some of their stock at greatly reduced prices. The disorganization of the diamond-cutting industry in Amsterdam as far back as the early part of 1914 appears from the fact that out of 9,800 members of the Amalgamated Union of Dutch diamond workers, more than 50 per cent., or over 5,000, were out of work at that time, the average number of unemployed workers never falling below 4,000 during the ante-bellum part of the year. This important beneficial organisation embraces almost all of the Dutch diamond workers. At the beginning of the war the proportion of unemployed rose to 80 per cent., the remainder only having employment for a part of their time. A little has already been done to revive the diamond-cutting industry in Antwerp. At the outbreak of the war the German and Austrian diamond dealers were practically driven from the city, but many of them returned after the German occupation. The German civil authorities in Antwerp have accorded some special privileges to the proprietors of diamond-cutting works with the result that this industry has been resumed to a limited extent. Of course wages have been greatly reduced. Where a wage of 75 francs was paid weekly the same worker has to be content with a weekly stipend of 28 francs. The demand is confined principally to the smaller stones, such as the half-carat diamond, locally called demi-gris, for which there is still a fairly good market in Germany, Austria, Italy and the United States. In London, Hatton Garden, long known as a centre of diamond interest, shows considerable activity, principally due to the presence here of many expatriated Belgian diamond cutters. From Amsterdam the report comes that in March of this year (1915) about 2,000 cutters were able to find employment, while some of the smaller number of Belgian workers in this industry who are still able to find something to do are employed by a few manufacturers in Schevenningen, Holland, who have temporarily set up some small establishments there. They have already combined in a trade association and have subscribed funds for the constitution of a local Diamond Exchange.‡ Although these efforts are necessarily on a small scale, still they testify to the vitality of the industry and serve to show that as soon as the pressure of hostile influences shall have been removed, the diamond industry will be ready to reassume its important place in the industrial life of Antwerp. An import duty is soon to be imposed in Canada on loose diamonds, which have heretofore been imported free. This duty is adjusted so as to favour English exporters, who have to pay only 5 per cent. of the value of the stones, while diamonds from Amsterdam or other non-British ports are dutiable at 7.5 per cent.

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[*] In the *Mineral Industry*, 1914.

[†] See Consul D. I. Murphy's report of April 10, in Supplement to Commerce Reports, June 11, 1915, No. 9a, pp. 3, 4—6.

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‡See *Jeweller and Metalworker*, March 15, 1915, p. 278.

THE VALUATION OF GOLD MINING SHARES.

Defects of Existing Tables—Calculation of Annuities—Present Value and Amounts at Compound Interest.

The determination of the value of a mining share obviously depends, for its accuracy, upon the reliability of the various factors which enter into the calculation. "If the life of a mine," as Mr. F. Hellmann observed during a discussion of this subject before the Institution of Mining and Metallurgy some years ago, "and the profit per ton milled over the total reef tonnage of the property—which involves the average grade of the ore and the average working costs over the life of the mine—could be definitely determined, the problem would be susceptible of an exact solution." Even then questions of policy and various other elements of risk would make the solution merely an approximate one at the best. Whatever be the degree of reliability to be attached to the data provided from time to time by mining companies, however, there are certain methods of calculating share values which are invariably used, and which form the basis of the various tables which have been compiled and published for this purpose. There are a great number of these tables in existence, and although each collection usually claims to be an improvement upon the others in some respect, generally in the matter of simplicity of arrangement and convenience in use, or of comprehensiveness, the objection is frequently made that the structure of the tables themselves is not sufficiently clear. It is assumed that the average person who takes to buying shares has a ready knowledge of the use and meaning of complex algebraical formulæ, or, if not, that he is satisfied to take things for granted. As a matter of fact the full meaning of these formulæ is not always obvious, at a glance, even to those who are competent to deal with them; and, as far as taking things of this kind for granted goes, it is not a process that commends itself to the individual who has the ordinary regard for his pocket. Some very well known methods of calculating share values have, indeed, been denounced before the Transvaal Mining Industry Commission as false, on the grounds that they have come into use through a misstatement of the theory of annuities. It is evident, then, that a full and lucid explanation of the basis upon which these valuation tables are constructed is a desirable addendum, in every instance, to the bare statement of the formulæ that have been used in their construction. The following notes have been prepared with the object of explaining, in a simple way, the principle of annuities upon which share valuation is commonly based.

CALCULATION OF INTEREST.

In making calculations regarding annuities the first point to be considered is the process by which we determine the sum that will, with the addition of interest at a given rate per annum, produce £1 in a certain number of years. Take the rate of interest, for example, to be 4 per cent. At the end of one year the sum of £1, together with the stipulated interest, will amount to £1.04, and the amount that will produce £1 under similar conditions is obviously $\frac{1}{1.04}$ or £0·961538. If the rate of interest is 4½ per cent., the sum that will produce £1 is $\frac{1}{1.045}$ or 0.956938. To obtain the sum that will produce £1 at the end of one year at any given rate of interest, divide £1 by 1, plus the rate of interest as shown above.

Inasmuch as £1 at 4 per cent. amounts to £1.04 at the end of one year, if this amount is again invested at the same rate, the amount at the end of the second year is 1.04 times £1.04, or £1.04 x 1.04, or £1.0816. The amount at the end of the third year that would accrue in the same way is £1.04 x 1.04 x 1.04, or £1.24864, and so on. If £1 will produce £1.0816 at the end of two years, at 4 per cent. compound interest, as shown, to produce £1 at the same rate and over the same period, it will be necessary to invest $\frac{£1}{1.0816}$ or £0.924556. It is by this process that tables of present values and amounts of compound interest are prepared, as the following for example:—

Years.	Amount £1 at 4 per cent.		Years.	Pres. value £1 at 4 per. cent.
1	1.0400000	......	1	.9615385
2	1.0816000	......	2	.9245562
3	1.1248640	......	3	.8889964
4	1.1698586	......	4	.8548042
5	1.2166529	......	5	.8219271

The first table represents the amount of £1 in the given number of years at 4 per cent. compound interest, and the second table shows the present value of £1 at the end of the given number of years, that is to say the sum that will amount to £1 at 4 per cent. compound interest, during the period stated. As explained above the figures of the second table are obtained by dividing £1 by the respective amounts shown in the first table.

"T.C.L." MINING AND PROSPECTING ACTIVITY.

Gold and Tin Interests—Absence of Rain in Outside Districts—Progress Report.

The report of the directors of the "T.C.L." on operations for the three months ended September 30, has the following, inter alia:—Mutue Fides No. 1844, District Waterberg.—Prospecting, mining and milling operations have continued during the quarter. No rain having fallen to replenish the catchment dams since 18th December last, it is possible that milling may have to be suspended if the rains do not come soon, but this is an eventuality which has always been foreseen. Dientje No. 552, District Lydenburg.—Prospecting work has been continued on one of the mynpachts with the result that the reef worked in the discovery claims has been located, and driving has started on same, but it is yet too early to form any opinion of its prospective value. Groenfontein Tin Mine.—The footage for the quarter was 577 feet, 235 feet of which were profitable, 327 feet development and 15 feet prospecting. The mill has been hired to the Zaaiplaats Lease during the quarter. There have been added to the ore reserves at grass during the quarter 1,618 tons of ore, estimated to contain 35.19 tons of 70 per cent. concentrate, making the total ore reserve dump at the surface at the end of the quarter 2,236 tons, estimated to contain 71.34 tons of 70 per cent. concentrate. It is estimated that the debit balance of £6,809 at 31st December, 1914, has been reduced to about £2,000 at the end of September, taking into consideration the value of the ore reserves, less the costs of future treatment. The appearance of the faces in the mine showed considerable improvement at the end of the quarter. A deep cut across the valley alluvial deposit is being made to expose the various layers of pay gravel. Rietfontein No. 3 and Rietfontein No. 1638, District Waterberg.—Prospecting for tin and molybdenite has been in progress on these farms during the period.

Mining Interests Held by the Company.

Rietfontein (T.C.L.), Limited.—917 feet of development have been done during the quarter; 3,324 tons were milled of an average value of 11.148 dwts. The quarter's operations resulted in a profit of £210. The pay shoot was struck at the 3rd level after 166 feet of driving; the last 20 feet averaged 9 dwts. over 51 inches, the values improving as driving proceeded, the face at the 30th September showing 14 dwts. over 51 inches. Fairview (T.C.L.), Limited.—1,068 feet of development have been done during the quarter. 5,650 tons were milled of an average value of 12.24 dwts. The quarter's operations resulted in a profit of £2,113. Swaziland Tin, Limited.—102 tons of concentrate were produced during the quarter at an estimated profit of £3,051. This is always the most unfavourable quarter of the year for production from this alluvial deposit on account of the falling off of the water supply during this period. Zaaiplaats Lease.—Milling of ore from this mine at the Groenfontein mill—hired for the purpose—has been in progress during the quarter. 1,988 tons were milled, estimated to contain 57.20 short tons of 70 per cent. concentrate: the actual recovery can, however, not yet be stated, as the roasting and redressing of the raw concentrate containing a high percentage of sulphides are not yet completed. Marico Zinc Mines.—The total production of concentrate during the preliminary run of the plant was 312 long tons, estimated to contain 48.7 per cent. of zinc. This concentrate has now been disposed of in England. As foreshadowed by the Chairman at the annual meeting held in June, the plant was closed down provisionally at the end of July, pending more favourable conditions for the disposal of the output. Mutue Fides and Tygerpad Tributing Area.—Work has been continued by the tributors during the period under review. It is understood that a milling plant is in course of erection.

RENEWED ACTIVITY ON THE KLEIN LETABA GOLDFIELDS.

Birthday, Louis Moore and Other Resuscitations.

There is a considerable amount of quiet development going on in the outcrop reefs on the Klein Letaba fields, says a correspondent of the Zoutpansberg paper. Referring particularly to individual properties, the Ellerton mine has been let to new and energetic tributors who are losing no time in getting to work. At various times this mine has been tried by other tributors, whose work was practically confined to operations above water-level. The present tributors, Messrs. Barlow, Highton & Co., are shaping well in the undertaking.

Birthday Mine.

Considerable new development has been carried out on this property. A reef has been found west of the old workings, which should run to over an ounce over the plates of the ten-stamp mill. This mill will be started at an early date by a new syndicate that has been floated and registered in Pretoria to open up this mine.

Lelatea Mine.

Operations on this property have had to be suspended on account of the death of the tributor. In 1893 4,000 tons of ore from this mine was crushed in the old Birthday mill, from which 4,010 ounces of free gold were recovered. At a later date the tailings from this were treated and the fortunate purchaser was able to recover from 15 dwts. to 1 oz. per ton. Work was suspended on this property in 1893 owing to a dyke intervening. When the late tributor took over he sunk a new shaft in this dyke and just prior to his death anticipated striking reef in another 15 feet. According to the latest report of the mining engineer, the new reef on this property is the same as that of the Birthday, the dyke having thrown it over.

Ophir Venture.

This property, on the Tsama River, two miles east of the Louis Moore, is now in full swing under the able management of Messrs. Ford and Lee. The reef is of the saddleback order and is opening up remarkably well—visible gold being in evidence all over. A Tremain mill has been erected on the Tsama River, which was started a couple of weeks ago. A recovery of free gold to the extent of from 15 dwts. to 1 oz. is confidently anticipated. A considerable amount of pegging has been done round this property, which includes the old Courtney mine. Foundations are being prepared for the immediate erection of another mill of five stamps.

Louis Moore Mine.

According to reports this mine will start developing at an early date. New shafts will require to be sunk as the old ones were condemned by the Government Mining Inspector.

Celtic Reef.

On the Tsama River six miles east of the "Ophir Venture." This property is under option to a Johannesburg financial man, whose consulting engineer is now on the property with a view to thoroughly developing it.

PHTHISIS PREVENTION COMMITTEE'S SPECIAL REPORT.

Injurious Particles of Mine Dust.

The special report of the Miners' Phthisis Prevention Committee on the percentage of injurious particles in mine dust and on the results of counting the particles of dust in the air, was issued this week. The Committee, in its researches, made tests of dry and wet drilling under various conditions as far as possible on the same mine, the Village Deep. The tests for the efficacy of water blasts were made consecutively in one development end. A tabular statement attached to the report give full particulars of each of the samples taken. The Commissioners remark: "During our investigations it was found that in the use of Leyner drills care has to be taken that these do not become so leaky as to atomise the water used, unless such water is clean water free from sediment. In the case in point, mine water from the pump column was being used and was being sprayed into the air by leaks from the machine, causing a dense fog. The sediment in the water, consisting largely of very fine injurious silica particles, was thus being transferred to the air and into the lungs of the person inhaling such air. The water contained no less than 23 million particles per c.c., and it was found that the dense fog created contained 9.2 c.c. of sprayed water per cubic metre of air, so that 210 million particles were derived from this source. The number of injurious particles per cubic metre of air was thus being increased from about 29 million particles derived from the drilling operations to 239 millions. It is obvious that similar contamination of the atmosphere takes place when dirty mine water is being atomised at any point of the mine. It is probably as dangerous to breathe the foggy air caused thereby as the clear air left after the evaporation of the fog. For atomising purposes only water quite free from injurious sediment should be used. A further point that emerges from our investigations is that as a measure of the injurious character of any air breathed the number of particles of dust per cubic metre is a better criterion than its weight. A small number of comparatively innocuous large particles add greatly to the weight, but not to the count of the particles of dust, as was shown by the fact that in the great majority of instances the number of very fine injurious dust particles exceeds 98 per cent. of the total."

THE FINDINGS.

Having analysed the results of wet and dry drilling with a variety of drills, the Committee summarises its deductions as follows:—

(a) Blasting operations produce enormous quantities of dust, the great bulk of which is very fine and of a most injurious character. Its inhalation should be avoided at all costs.

(b) Machine drilling without water produces a smaller quantity of dangerous dust than blasting, but the amount is still very large and is liable to be inhaled over a much longer period than that produced from blasting operations.

(c) By the use of water applied in a proper manner with suitable devices, the dangerous dust during drilling can be diminished to a small fraction of that produced when drilling dry.

(d) In drives and similar confined spaces the amount of dangerous dust produced by blasting operations can be reduced by the application of suitable water-blasts for a period of half an hour, to less than 1 per cent. of its original quantity, and is then comparatively innocuous.

(e) The imperative necessity of using proper devices for laying dust and of constant vigilance in their application is emphasised.

(f) The dangerous character of any dust contained in mine air is more nearly gauged by the number of particles in suspension than by their weight.

(g) In laying the dust by means of water, the very fine injurious dust is laid in practically equal proportions with the less fine dust.

(h) Ordinary mine water should not be used for spraying by means of atomisers, and where such water is used in a Leyner drill, the latter should be discarded if the air-leaks are such as to atomise the water and cause a fog.

(i) The dust in crusher houses can be easily rendered innocuous if reasonable precautions are taken.

(j) It may reasonably be hoped that the adoption of proper and readily applied methods of dust-laying, and of precautions in avoiding the inhalation of air charged with dust from blasting, has led, and will continue to lead, to a marked degree in the incidence of miners' phthisis.

The Committee is of opinion that the results presented in this report are of importance to the mining community, and merit publication at as early a date as possible. With the same object, a diagram embodying some of the main results of the investigation is also attached. It has been drawn up for the purpose of posting it up at the various mines, so that every one concerned can readily gain the information contained in it, and realise the importance of making use of the preventive measures to be employed. The Committee requests the Minister's permission to have this poster published immediately (by the Chamber of Mines), so that no time need be lost in spreading the information contained in it.

Effects of Damp Heat.

The admitted adverse influence of damp heat upon the efficiency of the miner gives interest to a paper by Surgeon **D. A. Mitchell**, R.N., published in the *Journal of State Medicine*, upon the effects of damp heat observed by the author in the Persian Gulf and elsewhere. By damp heat is here meant a dry bulb reading between 90 degs. and 100 degs. Fahr., and a wet bulb temperature within 5 degs. Fahr. of this. This represents the average condition in summer in the Persian Gulf on board ship, the shore climate, although hotter, being drier. The nature of the ailments traceable to this damp heat included boils inflammation of the external auditory meatus, ulcers, prolonged low pyrexia, anæmia, pelagic œdema, or beri-beri, slow healing of wounds. The author states that a consideration of the cases under his notice, and their behaviour under the different climatic conditions, has led him to the conclusion that "damp heat," of itself, frequently produces an alteration in the blood, visible only as anæmia, and that this alteration is primarily responsible for the difficulties encountered in the treatment of other conditions. If this alteration in the blood could be thoroughly investigated by elaborate chemical and bacteriological methods, a remedy, probably preventive in nature, might be found for the large amount of disease which at present proves so intractable in this climate. It would be interesting to know if similar deductions might not be permissible in the case of ailments attributable to damp heat underground.

NOTICE: To Mine Managers & Others

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MECHANICAL ENGINEER'S.
ELECTRICAL ENGINEER'S.
MINE SURVEYOR'S
by Class, Private Tuition and Correspondence

SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - 60% ,,
MECH. ENGINEERS - June (Kimberly Centre) - - ALL ,,
MINE OVERSEERS - - - - - - - Practically ALL ,,
NEARLY 200 SUCCESSES. **St. James' Mansions, Eloff Street.**

PROGRESS ON ALBU MINES.

Points from a Batch of Quarterly Reports.—West Rand Consolidated Profits Increased—Some Decreases.

THE results of operations of the Meyer and Charlton Gold Mining Company, Ltd., for the quarter ended on September 30th were as follow :—Ore mined, 46,721 tons; less waste ore discarded (4.64 per cent.), 2,171 tons; ore sent to mill, 44,550 tons; stamps, 75; tube mills, 2; total running time, 86.48 days; ore crushed, 44,540 tons; duty per stamp per day, 6.87 tons; yield in fine gold, 11,564.460 ozs.; yield per ton, 5.19 dwts.; sands and slimes treated (equal to 100.42 per cent. of tonnage crushed), 44,730 tons; yield in fine gold (including 86.12 fine ozs. from by-products), 12.632.09 ozs.; yield per ton treated, 5.65 dwts.; yield per ton on basis of tonnage milled, 5.67 dwts.; working cost per ton treated, 1s. 10.67d.; total yield, 24,196.55 ozs. (10.86 dwts. per ton milled); working costs, £40,456 12s. 5d.; cost per ton, 18s. 2d.; working profit for quarter, £61.292 8s. 5d. (£1 7s. 6.27d. per ton); gold from mill, £48,569 (£1 1s. 9.71d. per ton); from cyanide works, £53,055 16s. 3d. (£1 3s. 9.89d. per ton); sundry revenue, £124 4s. 7d. (0.67d. per ton); total revenue, £101,749 0s. 10d. (£2 5s. 8.27d. per ton). The working profit for the quarter is £83 10s. 7d. less than for the preceding quarter. The underground water service has been improved and extended. The cutting of the 21st and 22nd level stations and ore bins is proceeding.

VAN RYN ESTATE.

The quarter's operations resulted as follows:—Ore mined, 124,923 tons; less waste ore discarded (7.82 per cent.), 9,763 tons; ore sent to mill, 115,160 tons; stamps, 140; tube-mills, 6; running time, 81.74 days; ore crushed, 114,900 tons; duty per stamp per day, 10.04 tons; cyanide works, 114,900 tons (equal to 100 per cent. of tonnage crushed); mill, 22,477.61 ozs. (3.91 dwts. per ton milled); cyanide, 9,990.88 ozs. (1.74 dwts. per ton milled); total yield, 32,468.49 ozs. (5.65 dwts. per ton milled); working cost, £81,731 5s. 6d. (14s. 2.72d. per ton); working profit, £55,285 13s. 9d. (9s. 7.48d. per ton); from mill, £94,405 (16s. 5.20d. per ton); cyanide works, £41,960 (7s. 3.64d. per ton); sundry revenue, £651 19s. 3d. (1.36d. per ton); total revenue, £137,016 19s. 3d. (£1 3s. 10.20d. per ton). The working profit shows a decrease of £2,767 5s. 3d. for the quarter under review as compared to the previous three months, which is principally due to a temporary falling off of value in stope faces during July. In view of the fact that the charge to working costs (of 1s. 9d. per ton mined) in respect of mine development has for some time past been in excess of the actual cost of development, it was decided to reduce the charge to 1s. per ton mined as from the 1st July last. It is fully anticipated that the decreased rate will be sufficient to maintain the existing standard of ore reserves. The average development values, as shown in the previous page, represent the actual results of sampling, no allowance having been made for any reductions which may subsequently be considered advisable when compiling the ore reserves. The revenue from gold shown in the above statement is based upon the full estimated value of the gold, although in respect of the gold won during the quarter which has been deposited with the local banks for account of the Bank of England only 97 per cent. of the assay value thereof has been received by the Company—in terms of the arrangement between the Union Government, the Bank of England and the local banks. The remaining 3 per cent. of the value of the gold will be adjusted subsequently, after the bullion has been shipped to Europe.

NEW GOCH.

Results for quarter:—Ore mined, 105,950 tons; less waste ore discarded (14.488 per cent.), 15,350 tons; ore sent to mill, 90,600 tons; stamps, 120; tube-mills, 4; running time, 88.461 days; ore crushed, 90.400 tons; duty per stamp per day, 8.516 tons; cyanide works, 90,879 tons treated (100.53 per cent. of tonnage crushed); total yield, 20,929.661 ozs. (4.630 dwts. per ton milled); mill, 13,637.157 ozs. (1.613 dwts. per ton); working cost, £63,492 9s. (14s. 0.564d per ton); working profit, £24,536 4s. 9d. (5s. 5.140d. per ton); gold from mill, £57,274 12s.; value per ton, 12s. 8.056d.; gold from cyanide works, £30,627 9s. 4d.; value per ton, 6s. 9.312d.; sundry revenue, £126 12s. 5d. (0.336d. per ton); total revenue, £88,628 13s. 9d.; value per ton, 19s. 5.704d. The working profit shows a decrease of £390 7s. 1d. as compared with that for the previous quarter.

ROODEPOORT UNITED.

Ore mined, 109,578 tons; less waste ore discarded (7.31 per cent.), 8,007 tons; ore sent to mill, 101,571 tons; stamps, during July and August, 70, September, 75; tube mills, 4; running time, 78.77 days; ore crushed, 101,671 tons; duty per stamp per day, 18.01 tons; cyanide works, 101,069 tons (99.41 per cent. of tonnage crushed); total yield, 21,388.50 ozs. (4.20 dwts. per ton; mill, 14,390.25 ozs. (2.83 dwts. per ton); cyanide, 6,998.25 ozs. (1.37 dwts. per ton); working cost, £86,728 0s. 8d. (cost per ton .17s. 0.72d.); working profit, £3,563 6s. 3d. (8.41d. per ton); gold from mill, £60,439 (value, 11s. 10.67d. per ton); from cyanide works, £29,390 (5s. 9.37d. per ton); sundry revenue, £462 6s. 11d. (1.09d. per ton); total revenue, £90.291 6s. 11d. (value per ton, 17s. 9.13d.). Expenditure on capital account includes £1,453 9s. 11d. for permanent works. The working profit shows a decrease of £735 1s. 9d. as compared with that for the previous quarter.

WEST RAND CONSOLIDATED MINES.

Ore mined, 106,363 tons; less waste ore discarded (12.42 per cent.), 13,213 tons; ore sent to mill, 93,150 tons; stamps running, 100; tube mills, 4; running time, 80.17 days; ore crushed, 93,200 tons; duty per stamp per day, 11.62 tons; cyanide works, 91,015 tons (97.66 per cent. of tonnage crushed); total yield, 27.875.35 ozs. (5.98 dwts per ton milled); mill, 17,228.48 ozs. (3.69 dwts. per ton milled); cyanide, 10,646.87 ozs. (2.29 dwts. per ton milled); working costs, £86,903 11s. 4d. (per ton, 18s. 7.79d.); working profit, £30,450 14s. 7d. (per ton, 6s. 6.41d.); gold from mill, £72,358 12s. 9d. (15s. 6.33d. per ton); gold from cyanide works, £44,719 (9s. 7.16d. per ton); sundry revenue, £276 13s. 2d. (.71d. per ton); total revenue, £117,354 11d. (25s. 2.20d. per ton). Expenditure on capital account amounted to £9,876 10s. 8d. The working profit shows an increase of £7,322 10s. 4d. as compared with that for the previous quarter, as a consequence chiefly of an improvement in the grade of the ore milled. Having regard to the heavy increase in the cost of materials under the present war conditions and the difficulty of obtaining deliveries, it has been decided to postpone the ordering of the new plant designed for considerably augmenting the crushing capacity until more normal conditions prevail.

AURORA WEST.

Expenditure and revenue on basis of tonnage milled (45,296 tons).—Working expenses, £41.944 13s. 9d. (18s. 6.24d. per ton milled); working profit for quarter, £12,236 1s. 7d. (5s. 4.83d. per ton milled); revenue, £54.180 15s. 4d. (or 23s. 11.07d. per ton milled). Note.—No allowance has been made in the above statement for the Government tax on profits. Expenditure on Capital Account.—On account of permanent works, £3,450 15s. 8d.; machinery and plant, £1.982 8s. 3d.; total, £5,433 3s. 11d. The amount charged to working costs on account of "mine development redemption" is £2,569 10s. 6d. in excexess of the actual expenditure on mine development. The working profit shows a small increase of £86 13s. 9d. over that for the previous quarter. The new construction work referred to at the last annual general meeting of shareholders is now in process of completion. The erection of the new steel headgear should be finished during the current month; the new winding engine has been installed, and the work in connection with the new incline shaft is almost completed. It is therefore anticipated that the whole of the new plant will be brought into operation some time in November.

CORRESPONDENCE AND DISCUSSION.

The Outlook for Tin.

To the Editor, *South African Mining Journal.*

Sir,—The lowness of the price of tin shares has, no doubt, been perturbing shareholders for some time past, and to help to remove their cause for despair I would like to mention, through your esteemed journal, that a gentleman I met quite recently from Singapore (a great tin-smelting centre), informed me that in the opinion of English and foreign tin experts, the price of this much-required metal is likely to reach phenomenally high prices, far exceeding the highest figure that has yet been reached. After the war, to use his own words, he remarked, "every country in the world would be falling over one another for cassiterite."—I am, etc.,

E. L. E.

November 1st, 1915.

The New Metallurgy.

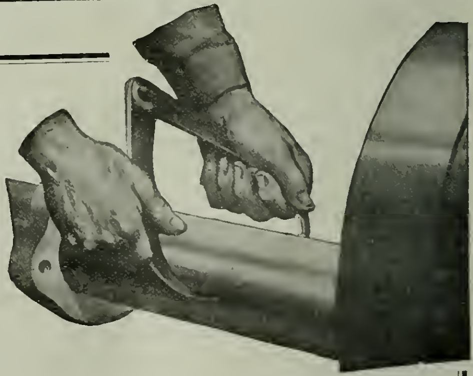
To the Editor, *South African Mining Journal.*

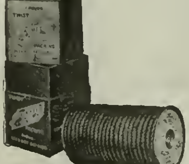
Sir,—With reference to your article on the new metallurgy, may I point out that the usual causes of the failure of refractory ore treatment are: Cost of upkeep; mine unable to keep a standard grade value, "result" constant regulating of concentrating plant; oil and acid processes, when getting more than a 5 per cent. concentrate, curd or ball (especially in the case of concentrates carrying a metal over a certain atomic weight), cause high residue; 5 per cent. being a low-grade on base metal, two processes have in nearly all cases to be resorted to; if alkaline solution can be successfully applied a great reduction in cost may be expected. Mr. Butters states that isolated localities are to benefit. I doubt it, as no mine of importance is isolated; the rail gets there sure, and the smaller ones that are isolated will and do loose 25 to 30 per cent. of their values rather than introduce processes which, although improving extraction to an extent, take away, in early all cases, any chance of dividends. At no distant date a process may be disclosed giving a good extraction of 90 per cent. or over on a battery plate; if it proves successful a lot of refractory ores will be made profitable.—I am, etc.,

T. P. BOND,

Mine Surface Tramming.

An effort is being made to replace natives by white men on surface tramming on the mines. The Public Relief Board is making the effort. It appears that the men who are doing this kind of work have not been able to get anything else to do, and two have been taken on at the Robinson. Mr. H. G. Parriss, the Superintendent of the Employment Bureau for Men, in his report to the Relief Board for September, mentions that these two men are "lashing and tramming on the surface, replacing coloured men at the same rate of pay and under exactly similar conditions. These men are working on piecework, and have averaged over 5s. per day. They started work on the 8th of the month and are still giving satisfaction, and I have been promised that when opportunity offers on similar work I shall have the chance of putting white men in. This is a fresh avenue of employment for white men," says Mr. Pariss, "and means a distinct gain to the community of the amount earned by these men." From inquiries, we gather that a committee of the Relief Board considered the question of replacing natives by white men on the mines at 6s. a day, and it was decided that it be an instruction to the superintendent to continue filling such places by sending elderly men who, in the ordinary way, would not earn more than this wage. It appears that elderly men can do surface tramming quite well, and there is a case of one man of 70 doing this work satisfactorily. Reference was made to the matter at a meeting of the Relief Board recently, and, in reply to a question as to what was a standard wage for unskilled labour, it was pointed out that the Municipality considered 6s. a day as a suitable wage for unskilled men. Mr. Soutter stated, however, that the Board did not want to manufacture poor whites. It was mentioned that whereas a man who went on the mines at 6s. a day as a learner had the opportunity of making higher wages, the man who drove a water cart for the Municipality got no farther. On this question of finding employment for men who cannot do so for themselves, the Relief Board has passed a resolution "that it be an instruction to the Superintendent to decline to send men to employers who wish to avail themselves of the existing depression and who offer a rate of pay which is unreasonable."





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UNION MINING STATISTICS FOR SEPTEMBER.

According to the monthly Yellow Book of the Union Department of Mines, the number of white employees on the gold mine on the Rand was 22,573, in other districts of the Transvaal 943, and in other parts of the Union 3, total 23,519. Reef and alluvial diggers numbered 105, and employees on metallurgical and tailings works 38; total for the gold industry 23,662. On diamond mines there were employed 1,059 whites, on coal mines, 1,344, on base mineral mines 621, and on lime and flint works 63, making a total for the mining industry of 26,749 whites. The Rand mines employed 203,772 coloured labourers, other districts of the Transvaal 11,560, and other Provinces of the Union 32; total 215,364. Reef and alluvial diggers employed 621, and metallurgical and tailings works 331, making a total for the gold industry of 216,316. On diamond mines there were employed 1,464 coloured persons, on coal mines 25,527, on base mineral mines 8,409, and on lime and flint works 1,043; making a total for the mining industry of 252,759.

Output.—The gold output of the Rand totalled 751,451½ ozs., value £3,191,963; other districts of the Transvaal 27,842½ ozs., value £118,266; and other Provinces, 13 ozs., value £54; a total of 779,307 ozs., value £3,310,283. The silver output amounted to 81,872 ozs., value £8,957; coal, 725,100 tons, value £186,252; and base minerals other than coal, value £67,947, a grand total value of £3,573,439.

Accidents.—There were 219 separate accidents, involving the death of four whites and 49 natives, and injury to 30 whites and 174 coloured. Of these, 172 accidents were on the Rand, and of the deaths three white and 43 coloured were on the Rand, and 23 whites and 135 coloured were injured on the Rand.

Matchwood.

Mr. John M. Sim, an authority on arboriculture, writing in the *Times of Natal*, urges the potentialities of poplar cultivation for match factories. As a sample of the need of producing a wood for this purpose within the Union, he points out that out of the four large match factories running in South Africa—at Rosebank, Kingwilliamstown, Durban, and Delagoa Bay—one has entirely closed down through the scarcity of suitable timber, and all the others are feeling the scarcity. Throughout South Africa the poplar is already abundant, although mostly as single trees. Where given a chance, these trees have almost invariably done well. On the poor, sandy soils of Capetown they have formed beautiful trees, in the driest portions of the Karroo when planted near dams and furrows they again have formed fine trees, while on the grassvelds of the Cape and Upper Natal, where they receive protection, they do well. Mr. Sim gives figures to show that no farming proposition could pay better on so little initial expenditure.

The best "Reef Traveller" is the *South African Mining Journal.*

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SHEET—SECTIONS TUBE—ALLOYS

Rhodesian Section.

RHODESIAN MINERAL OUTPUT FOR SEPTEMBER.

Official Returns of Gold and Other Minerals from Southern Rhodesia for the Month

We have received for publication from the office of the Rhodesia Chamber of Mines, Bulawayo, the following detailed statement of the mineral output for the month of September, 1915, with comparisons and values:—

MATABELELAND.

BULAWAYO DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Aapie (S. C. Reynolds) ...	5	56	14.63	61
Abercorn (W. J. Lane) ...	5	142	72.83	302
Agincourt (Hogg & Co.) ..	5	70	49.19	204
Andersons (Est. R. Barkley) sands	—	350	16.53	69
Antelope G. M. (Rhod.), Ltd....	2B 2P 2T	4089	1044.28	4329
Do. (slimes)	—	3762	1051.14	4357
Antenior (W. J. Lane)	5	203	54.94	228
Basch (Morrison & Granger)	5	400	46.40	192
Do. (sands)	—	260	20.73	86
Bassick (Bassick Mine. Synd) ..	5	255	94.21	391
Do. (sands)	—	150	11.78	48
Bessie East (T. Berwitz)	2	80	20.42	85
Big Ben (W. E. Hunt)	4	225	76.71	318
Blanket (Blanket Synd.)	15	1072	150.28	623
Bulawayo Main A (Aserman & Cormack)	2	171	96.52	400
Do. (sands)	—	236		
Bunney's Luck (W. H. Rabbets)	2	87	44.62	185
Carry (Boomerang Syndicate) .	1H	232	226.80	940
Do. (sands)	—	175	45.92	190
Cecil (Master Cecil Syndicate) ...	3	20	9.79	41
Claremont (T. J. McFarlane) sands	—	291	29.01	120
Coker (P. J. Roche)	(5)	25	2.84	12
Coquette (W. H. Robinson) ...	2	190	43.38	180
Cottage (Cottage Synd.)	4	325	49.42	205
Do. (sands)	—	170	13.43	56
Donove A (W. K. Early)	3	10	51.03	211
Durban (Durban Syndicate)	2	170	258.12	1070
Do. (sands)	—	100	75.92	315
Eagle A (Macdonald & Co.)	10	1027	287.12	1190
Do. (sands)	—	390	55.65	231
Edward (Warren & Guest)	5	560	142.86	592
Emva (P. G. Challen)	5	33	15.33	63
Ettie (Ettie Synd.)	3	290	45.53	180
Farvic (H. S. Henderson) . .	5	853	620.37	2594
Do. (sands)	—	426	65.33	277
Fred (Transvaal & Rhod. Estate)	10 2P	1800	749.95	3109
Do. (sands)	—	1800	193.44	802
Germania (A. G. Hadingham)	2	195	81.39	337
Godwin B (Barrett & Stacey)	5	204	164.01	680
Gold Prince (W. Pichanick) ...	5	92	14.92	62
Hildata (R. Aserman)	5	200	35.00	145
Hildata A (R. Aserman)	(5)	365	67.42	279
Do. do. (sands) ..	—	320	54.06	228
I Alone (Huntley & Worthington) sands	—	208	19.28	80
Intabanenda (Intabanenda Synd.)	5	410	122.10	506
Ieffs (Hortor & Stewart)	3	76	69.74	289
Jumpers (J. P. McCoy)	5	340	236.56	981
Do. (sands)	—	120	8.87	37
Kernel (E. Farrar)	5	320	111.94	464
Klondyke (Lunnun & Striven)	5	67	25.80	107
Lone Hand (Armstrong & Furber)	5	405	176.92	733
Do. (sands)	—	255	43.45	180
Lonely Reef G.M. Co., Ltd. ...	20 3T	4550	510.63	2117
Do. (slimes)	—	4550	2025.10	8395
Lonely Star (E. K. Jubber)	5	60	17.08	71
Mab (E. Clayton) sands	—	200	8.99	37
Mamba (Nicholls & Co.)	5	165	60.75	252
Do. (sands)	—	110	13.12	54
Margaretta (Smith & Bowley) . .	4	97	30.36	126
Mollikins (H. Ashburner) pannings	-	—	1.51	6
Mulloch (J. B. Richardson)	2	76	42.88	178
Matabele 3 (Criterion G.M., Ltd.)	10	1379	183.07	759
Do. (sands)	-	600	15.09	62
Matabele Queens Co., Ltd. .	10	1730	400.32	1660
Do. (sands)	—	1730	365.30	1514
Nelly (F. D. Roscoe)	3H	840	471.52	1955
Do. (sands)	—	600	190.15	788
New Eclipse (J. R. Stewart) .	5	667	182.75	758
Nicholson (Cunningham & Allison)	15 1C	1830	169.80	704
Do. (sands)	—	40	9.33	39
Northumberland (R. Martindale)	2	70	10.12	42
Hand (R. F. McMillan)	2	95	24.01	99
Old Nic (Chart. and General E. & F. Co., Ltd.) ...	15 4P	2367	502.42	2083
Do. (sands)	—	1257	146.23	606
Peach A (Peach Syndicate) ...	5	152	321.33	1332
Penzance (Macdonald & Co.) ...	2	313	35.32	146
Do. (sands)	—	200	29.23	121
Planet (Huntley & Worthington)	—	—	28.94	120
Prince Olaf (K. Johnsen)	5	378	238.50	989
Princess 2 (C. A. Abbott)	2	58	26.56	110
Do. (sands)	—	350	15.84	66
Queens West (Cumings & Berry)	3	234	128.87	534
Do. (sands)	—	465	92.08	382
Robin Hood (L. Granger)	5	300	53.81	223
Sinti (Gillman & McDonald) ...	-	—	3.28	14
Slope I (E. E. Beecroft)	5	425	63.83	265
Star (Romola Nigel G.M. Co.)...	5	315	101.62	421
Do. (sands)	—	320	52.48	218
Teutonic (Bonshor & Battersby)	5	550	113.17	469
Union (P. Schwirner)	1H	199	44.75	185
Wolley Dog (P. H. Davis)	2	305	447.45	1855
Bulawayo district total ...			14,256.40	59126

GWELO DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alderman (Williams & Woodger)	5	375	132.56	550
Ardpatrick (J. E. & F. Maleham)	3	150	42.45	176
Bedad (A. & B. Syndicate) ..	5	175	35.14	5622
Bell Reef Dev. Co., Ltd.	2B 1T	2565	1356.11	5622
Do. (concentrates)	—	95	81.79	327
Bonsor B323 (Cornish Syndicate)	10	950	232.78	965
Do. (sands)	—	900	72.56	301
Bonsor B327 (T. Roberts)	10	800	111.76	463
Cactus (Renton & Grey)	5	300	59.70	247
Do. (sands)	—	280	45.30	188
Camelia (S. Levin)	10	1273	316.40	1312
Do. (sands)	—	600	39.60	164
Collingwood (Pini & Wearing) ...	5	460	31.46	130
Do. (sands)	—	500	31.74	132
Csardas (Wolfshall Syndicate) ...	10	621	581.06	2409
Do. (sands)	—	480	84.05	348
Do. (slimes)	—	141	17.62	73
Eileen (M. L. Price)	5	540	36.59	152
Falcon Mines, Ltd.	31 3T	18660	3524.98	14805
Do. Copper, £15,174.				
Fed Up (A. Malcolm)	5	266	53.36	221
Gaika G.M. Co., Ltd.	5 1C	3083	1486.88	6245
Do. (sands)	—	1205	67.23	282
Do. (slimes)	—	1381	135.56	569
Glen Hume (Hume, Withey & Walker)	5	800	206.81	857
Glen Rosa (Glen Rosa Synd.) ...	10	1100	1080.02	4477
Do. (sands)	—	650	289.82	1201
Glen Rosa 9 (B. Reed)	2	15	1.24	5
Globe & Phoenix G.M. Co., Ltd.	10 10P	6008	6153.24	25844
Do. (sands)	—	4319	845.47	3551
Do. (slimes)	—	2269	263.80	1108
Do. (concentrates)	—	229	528.03	2218
Leopard (Leopard Trib. Synd.)	5	650	118.38	491
L'Espoir (P. Harrower)	5	250	43.06	178
Meg (J. M. Haynar)	2	528	86.78	360
Moss (W. M. James)	5	779	391.97	1625
Moltum (J. T. Woods) sands ...	—	200	5.53	23
Nautwich (B. Frau)	3	26	5.53	23
New Dunraven G.M. Co., Ltd.	5	885	125.57	521
Do. (sands)	—	640	34.04	141
Pacific (Wanderer Sel. G.M. Co., Ltd.)	4GR	353	34.91	145
Paganiesa (W. H. Peard)	15 2P	613	192.21	797
Do. (sands)	—	545	93.52	388
Pondo (F. C. Luxat)	5	540	121.88	505
Do. (sands)	—	260	31.57	131
Redhill (T. McDonald) sands ...	—	1580	90.99	377
Romney (T. Pedlow)	5	276	90.00	373
Selukwe Columbia G.M. Co., Ltd.), Danga	10 1P	125	42.32	175
Do. (sands)	—	125	19.45	81
Do. Wonderland		1301	446.93	1853
Do. (sands)	—	1301	205.44	852
Do. Yankee Doodle	10	1433	174.54	723
Do. (sands)	—	935	113.85	472
Do. (slags)	—	—	11.41	48

MASHONALAND.

	No. of stamps.	Tons treated.	Yield. ozs.	Value £
Gwelo District.—				
Shamrock (Crampin & Masters)	5	600	39.40	163
Sheba (S. A. Wakes) clean-up	—	—	15.37	64
Tabekwe (A. N. Tyrrell)	20	2240	389.53	1615
Taxul (F. C. Luxat)	1H	650	75.79	314
Do. (sands)		500	55.56	2[illegible]0
Umpali (Bolt & Franks)	5	450	90.26	374
Do. (sands)	—	100	21.00	87
Veracity (L. R. Evans)	2	250	93.43	387
Do. (sands)	—	320	69.46	288
Walrus (L. R. Evans)	6	100	51.01	211
Winning Post (G. M. Hughes) pannings	—	—	2.92	12
Zabonkwe (Holmes & Urquhart)	5	795	53.34	221
Do. (sands)	—	600	92.38	382
Wanderer (Selukwe G.M., Ltd.)	4GR	11617	1190.41	4935
Gwelo district total			22664.85	9465[illegible]
Less over-declared August			51.36	2[illegible]3
			22613.49	944[illegible]

Matabeleland Total 36.921.25 ozs.

Value £153.779

	No. of stamps.	Tons treated.	Yield. ozs.	Value £
Hartley District—				
Agnes (P. S. Triggs)	5	120	32.29	134
Arlandzer (Keir & Rooke)	10	1550	56.02	232
Do. (sands and slimes)	—	1550	231.70	961
Baltimore & Virginia (P. A. Enke)	5	530	63.62	264
Bonheur (T. H. Long)	2	48	35.15	146
Brilliant (Mabel's Luck Synd.)	5 1P	727	152.45	632
Do. (sands)	—	710	77.87	323
Brompton (R. R. Aitken)	5	780	156.99	651
Do. (sands)	—	600	54.80	227
Cam & Motor G.M. Co., Ltd.	R'tg.	11483	4334.71	18379
Do. (slimes)	—	1196	106.84	453
D. (slags)	—	—	430.75	1788
Cheshire Cat (Arnold & Windley)	5 1P	195	42.62	177
Do. (sands and slimes)	—	195	20.37	84
Do. (clean-up)	—	-	65.45	271
Concession Hill & W. Ext. (C. E. Simpson)	—	1657	315.58	1308
Do. (sands)	—	975	69.71	2[illegible]9
Dalny (Macdonald & Sale)	1C	1651	89.47	371
Do. (sands)	—	1374	165.31	685
Dalny 1 W. (Macdonald & Sale)	5	530	58.81	244
Do. (sands)	—	315	44.73	187
Eiffel Blue (P. H. G. Owen) Co., Ltd.)	10	1309	624.26	2588
Do. (sands)	—	780	46.29	192
Eiffel Blue (P. H. G. Owen slimes	—	1200	33.90	141
Eileen Alannah Mining Co., Ltd.	12 2T	3687	393.93	1633
Do. (sands)	—	4300	1510.23	6261
Enny Ext. (E. C. Goodyer)	5	520	120.28	499
Do. (sands)	—	350	26.14	1[illegible]8
Excelsior (Smith & Heard)	2	60	15.31	63
Giant Mines of Rhodesia, Ltd.	30 2T	5017	861.44	3544
Glasgow Mines, Ltd.	5	567	123.30	511
Do. (sands)	—	252	47.95	199
Glencairn (Glenrosa Mines, Ltd.)	5	790	974.99	4042
Golden Valley (J. Mack)	10	1207	464.21	1924
Do. (sands)	—	718	150.07	622
Kanyemba (Kanyemba Synd.)	10	1050	456.43	1892
Do. (sands)	—	720	152.62	633
Klondyke (M. Nowak) pannings	—	—	5.00	21
Little Kitty (O. T. de Villiers)	3	50	12.47	52
Mudale (E. A. McDowell)	5	340	63.32	262
Oleander (O. T. de Villiers)	3	350	77.31	320
Do. (sands	—	300	26.16	108
Owl (A. Rolfe)	10	1636	830.76	3144
Do. (sands)	—	1850	500.06	2073
Pearl (White & Williams) pngs.	—	—	3.30	14
Pomposo (J. Knott)	5	312	91.27	378
Poverty (D. J. Laing)	5	550	102.71	426
St. George (Hussey & Fraser)	2	180	45.70	189
St. Louis (Smith & Heard)	2	30	13.48	56
Seigneury (Seigneury Syndicate)	10	867	100.07	415
Do. (sands)	—	944	19.70	82
Seven Sevens (7 7's Syndicate)	3	331	21.24	88
Shepherds (Phœnician (R) Co., Ltd.	5 1T	1060	249.28	1033
Do. (sands)	—	1060	136.09	564
Thistle Etna G.M., Ltd.	1C	1502	375.53	1558
Do. (sands)	—	1647	140.07	582
Victoria (Crown Synd.)	4	120	27.20	113
Village Main I (Bruce & Buchanan)	5	336	96.04	398
Village Main (Cuba Syndicate)	5	350	29.01	120
Washington (I. J. Minnaar)	5	400	85.64	355
Do. (sands)	—	300	29.27	121
Hartley District.—				
What Cheer (H. Moser)	5	392	362.16	1501
Do. (sands)	—	650	118.99	493
Hartley district total			16168.51	67422
Lomagundi District—				
Alluvial (N. Griffith)	—	-	13.83	57
Do. (L. G. V. Schapke)	—	—	8.49	35
Do. (R. G. Harding)	—	—	17.26	72
Do. (E. G. Quarrie)	—	—	11.47	48
Do. (F. J. R. Needham) August	—	—	10.93	45
Do. do.	—	—	6.08	25
Do. (W. Smart)	—	—	12.84	53
Pannings (H. G. Eastwood)	—	—	.47	2
Colorado (Diggers Synd.) sands	—	76	4.65	19
Eldorado Banket G.M. C., Ltd.	20 1C 4P	4073	1755.07	7372
Do. (sands)	—	4318	667.44	2803
Golden Kopje Prop. Mines, Ltd.	60 2T	11465	917.87	3855
Do. (slimes)	—	11465	1528.89	6421
Lone Hill (C. W. Day)	2	79	15.15	63
May (May Syndicate)	5	382	75.56	313
Medway (F. L. Standen)	5	507	87.30	362
Lomagundi district total			5133.30	21545
Mazoe District—				
Alluvial (J. A. Brosdryk)	—	—	4.75	20
Botha H (Lancum Syndicate)	1H	635	17.82	74
Blue Lagoon (Violet Lagoon Syndicate)	—	150	12.80	35
Chin (Arrow Syndicate, Ltd.) sands	—	250	35.35	147
Day Dawn (Day Dawn Tribute)	2	202	75.79	314
Do. (sands)	—	227	45.88	190
Honest	—	—	12.23	51
Jumbo G.M. Co., Ltd.	20	1760	475.48	1971
Do. (sands)	—	1040	132.84	551
Do. (slimes)	—	720	57.93	240
Do. "Reno"	—	440	118.87	493
Do. (sands)	—	260	33.21	138
Do. (slimes)	—	180	14.48	60
Kimberley (Mash.) G.M. Co., Ltd.	8 2T	4350	1009.36	4281
Do. (sands)	—	2150	318.87	1352
Do. (slimes)	—	2200	265.76	1127
Mainstay (F. J. Cole)	—	34	14.16	59
Micky (Micky Syndicate)	2	500	181.02	750
New Darwin (Howard & Southey)	2	72	17.43	72
Promoter (F. C. Croxford)	1C	2346	85.13	353
Do. (sands)	—	—	96.13	398
Ravine	2	157	39.44	163
S.D.C. 3 E (B. G. Byerley)	1H	1080	91.41	379
Shashi (C. Laland)	2	227	92.71	384
Syrian (F. A. Badenhorst)	3	63	13.56	56
Tat (W. M. Epton)	5	580	58.16	241
Do. (sands)	—	340	31.72	131
Venus (Giles & Southey)	2	300	120.78	501
Yellow Jacket (J. J. Barger) sands	—	300	10.43	43
Mazoe district total			3483.50	14592

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Salisbury District—				
Alpes (P. Zaffere)	5	190	173.48	719
Do. (sands)	—	360	75.07	311
Beatrice (Scott Synd.)	10	605	113.28	4[illegible]0
Do. (sands)	—	473	30.96	128
Black Cat (Black Cat Synd.)	2	150	92.52	383
Ceylon (Ceylon Syndicate)	5 1P	929	148.94	617
Do. (slimes)	—	929	217.03	901
Cross-your-Luck (Seb. and District Mines)	2 1P	264	51.02	211
Do. (sands)	—	127	54.50	226
Do. (slimes)	—	250	62.85	261
Found A (Grey's Syndicate)	2	200	129.22	536
Do. (sands)	—	220	68.47	284
Joking (Harrison and Drabble)	2	167	283.54	1175
Do. (sands)	—	190	94.13	390
Kenilworth (Kenilworth Synd.)	2	80	18.15	75
Koodoo (Est. R. Tyron)	5	412	155.11	643
Do. (sands)	—	462	86.40	358
Louise Grand (H. S. Plant)	1H	1007	80.94	335
Do. (sands)	—	585	53.00	220
Do. (slimes)	—	422	—	—
Mill (L. Chiappini) sands	—	600	67.45	280
Mont d'Or (Claxton & Bussell)	5	317	63.98	265
New Full Back (N. F. B. G.M. Syndicate)	2	194	25.18	104
New Agnes (Fungwe Developing Syndicate)	5	236	66.90	277
Olympus (D. Peridis) Aag.	10	400	54.37	225

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
SALISBURY DISTRICT.				
Planet (Planet Tribute Synd.)	10 1P	80	186.92	775
Do. (slimes)		805	219.60	910
Radnor (London and Rhodesian M. & L. Co.)	5 2P	1050	441.58	1831
Runaway (Tarr & Fulton)	3	12	4.94	20
Shamva Mines, Ltd.	56 8T	47534	2188.10	9190
Do. (sands)	—	23338	3219.47	13522
Do. (slimes)	—	23364	3219.47	13522
Do. (slags)	—	—	34.68	146
Southern Cross (H. G. Bateman)	1D	27	37.04	154
Salisbury district total			11818.38	49464
UMTALI DISTRICT				
Champion 193 (J. Buchanan)	5	160	32.98	137
Do. (sands)	—	140	57.78	240
Constance (J. F. Kapnek)	5	1210	163.70	679
Florence (P. M. Branken)	5	92	31.43	130
Golden Frog (W. A. Hoole)	1C	67	7.34	30
Grand Manika (Grand Manika Syndicate)	5	270	30.90	128
Do. (sands)	—	260	5.92	25
Inca (F. Young)	5	300	78.25	324
Liverpool (R. G. Snodgrass)	5	518	106.62	442
Do. (sands)	—	200	59.98	249
Montezuma G.M. Co., Ltd.	10 1P	1000	77.18	320
Do. (sands)	—	—	12.94	53
Mountain (F. E. Markham)	5	129	31.17	129
Pilgrim 2E (O. R. Cawood) sands	—	1650	28.68	119
Rezende Mines, Ltd.	60	9100	1107.02	4697
Do. (sands)	—	2900	263.34	1117
Do. (slimes)	—	1515	138.27	587
Do. (concentrates)	—	4636	435.15	1827
Two Sisters (Mrs. Harris)	2	30	17.48	72
Umtali district total			2686.13	11305
VICTORIA DISTRICT—				
Empress (S.A. Pros. and Con. Syndicate)	5	1500	187.94	779
Do. (sands and slimes)	—	800	163.44	678
Ruby (E. Frankis)	5	110	42.04	174
Sunbeam (Douglas & Durrell)	5	680	303.78	1259
Texas (P. S. Warder)	10	150	72.54	301
Victoria district total			769.74	3191

Mashonaland Total	40,059.56 ozs.
Value	£167,519
Grand Total	76,929.45 ozs.
Value	£321,085

GRAND TOTAL.

	Quantity.	Estmated Value.
Gold, ozs.	76,929.45	£321,085
Silver, ozs.	15,265.96	1,352
Copper, tons	309.23	15,404
Coal, tons	37,368	11,451
Chrome Iron, tons	6,735.10	15,054
Asbestos, tons	223.10	3.570
Lead, tons	3	63
Diamonds, carats	49.75	180
Grand total value		£368,159

ASBESTOS YIELD.

	Tons.	Est. value.
Balmain (Mrs. Goddard)	11	176
Gatha (Victoria Rhodesian Asbestos, Ltd.)	27.25	436
King Asbestos R., Ltd.	146.85	2,350
Regina (P. Nightingale)	38	608
Totals	223.10	£3.570

GOLD OUTPUT COMPARISONS.

	ozs.	£
August, 1915	82,544.57	344.493
September, 1915	76,929.45	321,085
Decrease	5,615.12	23,408
September, 1914	74,141.86	309,398
September, 1915	76,929.45	321,085
Increase	2,787.79	11,687

Grand Total Output to Date: Lead, 7,091 tons; copper, 3,957 tons; chrome iron, to Dec. 31, 1915, 279,651 tons, 1914, 48,207 tons. 1915, 38,515 tons, total, 366,373 tons; coal, to Dec. 31, 1913, 1,609,68[illegible] tons, 1914, 349,459 tons, 1915, 262,464 tons, total, 2,221,610 tons: tungsten ores, 129.10 tons; antimony, 13.75 tons; arsenic, 76 tons; asbestos, 2,903 tons; diamonds, 10,738.50 carats; other precious stones, 90,069.50 carats.

C: Chilian Mill. T: Tube Mill. G.R: Gates Roll. H: Huntington Mill. P: Grinding Pan. Pn: Pneumatic Mill; D: Dolly.

THE MONTHLY TOTALS.

The folloing table shows the value of the monthly and annual gold outputs of Southern Rhodesia since January, 1912, together with the value of the annual outputs of other minerals :—

Month.	1913. £	1914. £	1915. £
January	220,776	249.031	293,133
February	208,744	259,888	286,789
March	257,797	273,237	299,686
April	241,098	295,907	315,541
May	243,452	290,063	318,898
June	240,303	306,421	322,473
July	249,302	320,670	336.566
August	250,576	316,972	344,493
September	250,429	309,398	321,085
October	247,068	337,241	
November	239,036	311,711	
December	254,687	309,669	
Gold	2,903,268	3.580,208	2,838,664
Minerals	253.674	302,791	338,916
Total value	3,156,942	3,882,999	2,177.580

Rhodesia Chamber of Mines' Report.

The report of the Executive Committee for the month of September, 1915, shows the following summary of the returns of native labourers employed on Southern Rhodesian mines during the months of July and August:—Local: July, 14,158; August, 13,790. Portuguese territory: July, 7,456: August, 7,579. Northern Rhodesia: July, 9.408; August, 8,817. Nyasaland: July, 9,096; August, 9,501. other sources: July, 938; August, 1,003. Total: July, 41,056; August, 40,690. The number employed in August shows an increase of 2,930 as compared with the same month of 1914. Membership.—Mr. H. S. Henderson, V.C., has become a member of the Chamber under Rule 6. Price of Gold.—In reply to inquiries your Committee have been informed by the banks that, in view of the cost of war risk insurance, there does not appear to be any likelihood at present of the present purchase price of native gold—76s. per standard ounce—reverting to the price prevailing before the war. Mine Employes and the War.—It has been suggested that the Chambers of Mines and Small Workers Association should present certificates of service to mine employes who have wished to proceed on active service, but have been prevented from doing so owing to the requirements of the industry. Your Committee approve of the suggestion and are communicating with the Chamber of Mines, Salisbury, on the matter.

Bulawayo and General Exploration.

The directors report on the Bulawayo and General Exploration for the year to March 31st states that the company's list of investments remains practically unchanged; but the heavy fall in all securities consequent upon the war is naturally reflected in their valuation. A marked appreciation, however, has taken place in the price of Wankie Coal shares, in which this company has a considerable holding. The Pearl and Leopard Mine, in Rhodesia, which for so long has lain dormant, is now let on tribute on favourable terms. The Chislet Colliery, Ltd. (North Kent Coalfieds), in which this company has an interest, is making good progress both in surface work and the sinking of shafts. There is reason to believe that this interest will prove a valuable asset.

THE WEEK IN THE SHAREMARKET.

Increasing Business—Fluctuations at Higher Levels—Improving Prospects.

DESPITE minor fluctuations at higher levels, the general trend of prices this week has been upward, accompanied by increasing business. Barnato stocks remain in high favour, and a satisfactory statement at the annual meeting of the J.C.I. on Tuesday is being anticipated. The improvement in prices is, of course, thoroughly justified, though in the circumstance of a world-war it is unexpected. The October output returns are proving most satisfactory, and with the prospects of dividend declarations next month, the market is now hardly likely to look back. Corner House stocks have shown some notable improvements in the week, the two Modders and City Deeps well in the van. Tins have been a trifle better on the better prices for the metal; but diamonds remain inactive. The prospects of a good market all round have not been better since the war began.

	Frid. 29th.	Sat. 30th.	Mon. 1st.	Tues. 2nd.	Wed. 3rd.	Thurs. 4th.
African Farms . . .	7 10*	7 6*	7 6*	7 8*	7 10	7 9
Apex Mines	17 0*	17 0	17 0*	17 3	17 3*	17 0*
Aurora Wests . . .	8 6*	8 6*	8 6*	8 6*	9 0†	8 6
Bantjes Con.	—	5 4*	5 6	—	5 0	4 9*
Brakpan Mines . .	62 9*	63 6A	64 6*	—	65 6	65 0*
Brick & Potteries .	—	—	5 0*	5 0*	—	—
Cassel Coals	—	19 0*	19 0*	19 0*	19 0*	19 6*
Cinderella Cons. . .	2 9*	2 9*	2 9*	—	2 9*	—
City & Suburbans .	42 6*	43 0	42 6*	42 6*	42 6*	43 0*
City Deeps . . .	64 6*	63 6*	65 0*	66 6	66 6*	67 0
Cloverfield Mines . .	5 6*	—	5 7*	5 9*	5 10	5 10
Clydesdale Collieries	12 6*	12 0*	12 6*	12 6*	13 0*	13 0*
Concrete Construct .	2 6†	—	2 6†	2 6†	2 6†	—
Con. Investments . .	15 0*	15 0*	—	15 0*	—	14 9*
Con Langlaagtes . .	38 0*	40 0†	38 3*	38 6*	40 0†	38 3*
Con. Main Reefs . . .	18 9*	18 9*	18 9*	19 0	19 0	18 9*
Con. Mines Selection	10 3*	10 6	10 9*	10 9*	10 6*	10 0*
Coronation Collieries	—	—	—	—	—	25 0*
Coronation Frees. . .	—	—	—	—	0 2*	—
Crown Diamonds . .	2 0†	—	1 3*	1 3*	1 3*	1 3*
Crown Mines	—	—	—	72 6†	—	70 0†
Crown Mines Deb. .	£98*	£98*	£98*	£98*	£98*	£98*
East Rand Cents. . .	2 10*	2 10*	2 10*	2 10*	2 10*	—
East Rand Coals . .	2 0*	2 0B	2 1*	1 11*	—	1 10*
East Rand Deeps . .	1 4*	1 4	1 3*	1 4*	1 6†	—
East Rand Minings .	6 6*	6 9†	6 6*	—	6 6*	6 6*
East Rand Props. . .	—	21 0*	21 6*	21 6*	—	—
East Rand Debs. . .	£84*	£85	—	—	—	—
Eastern Golds . . .	1 5*	1 3	1 3*	1 3*	1 3*	1 3*
Frank Smith Diams.	1 4*	1 4*	1 4*	—	1 4*	1 4*
Geduld Props. . . .	33 0	32 6	32 9	33 3	33 6	33 6
Glencairns	2 1*	—	—	2 0*	—	—
Glynn's Lydenburgs .	—	—	10 6†	—	10 6†	10 6†
Goerz & Co.	12 0*	12 0*	12 0*	—	12 6*	12 0*
Government Areas .	26 6	25 9*	26 6	26 9*	28 9	27 6
Jupiters	6 3	6 3*	6 5	6 6	6 5*	6 5*
Kaalfontein Diams. .	—	—	0 2†	—	—	—
Klerksdorp Props. .	—	—	1 6*	—	1 6*	1 6*
Knight Centrals . .	11 7	11 6	11 7*	11 8	11 7	11 4
Knights Deeps . . .	—	—	—	23 0*	—	—
Lace Props.	3 6*	3 6*	3 7*	3 6*	3 6*	3 6*
Langlaagte Ests. . .	—	—	16 0*	16 6*	16 6*	—
Luipaardsvlei	7 3*	7 3*	7 3	7 6*	7 9*	7 9*
Lydenburg Farms . .	5 3	5 2	5 3	5 2*	5 1*	5 4*
Main Reef Wests . .	7 6†	7 0*	7 3*	7 3*	7 4*	7 4*
Main Reef W. Deb.	—	—	—	—	£70†	—
May Consolidated . .	6 0*	—	—	—	—	—
Meyer & Charltons .	108 9†	—	102 6*	—	—	100 6*
Middelvlei Estates .	1 4*	1 4	1 4*	1 4*	1 4*	1 4*
Modder B	111 0*	111 0*	112 6*	114 0*	118 0	116 9
Modder Deeps	100 0	99 9*	100 6*	102 6*	103 6	102 6
New Boksburgs . .	0 10*	0 11*	0 10*	—	1 0*	1 0*
New Eland Diams. .	—	—	10 0†	10 0†	—	10 0†
New Era Cons. . .	6 11	6 11	7 0	6 11	7 0	—
New Geduld Deeps	2 5*	2 5*	2 4*	2 7	—	2 7
New Kleinfonteins .	25 0	24 3*	25 0	24 6	24 6	24 3*
New Modderfonteins	392 6*	307 6†	306 3D	—	307 6	306 3*
New Rietfonteins . . .	—	0 3*	—	—	—	0 3*
New Unifieds . . .	16 9*	17 0*	17 0*	—	—	—
Premier Defs.	77 6*	—	—	77 6*	—	82 6*
Pretoria Cements . .	43 0*	44 0*	43 0*	—	—	—
Princess Estates . .	3 0*	3 0*	3 0*	3 0*	3 0*	3 0
Rand Klips	4 6*	4 0*	4 0*	4 0*	4 4	
Rand Mines	85 0†	—	—	—	—	—
Rand Nucleus . . .	—	1 6†	1 4*	1 5*	1 5*	1 –
Randfontein Deeps .	3 3*	3 0*	3 0*	3 3*	3 0*	3 3†

*Buyers; †Sellers: A ex London: B Odd lots: C ex dividend: D 50 shares.

	Frid. 29th.	Sat. 30th.	Mon. 1st.	Tues. 2nd.	Wed. 3rd.	Thurs. 4th.
Randfontein Ests. .	13 0†	12 3	12 6†	—	11 6*	11 6*
Robinson Deeps . . .	20 6*	—	21 0*	21 6*	21 6*	—
Rooibergs	15 0†	13 0*	14 0	13 6*	11 6*	14 0
Roodepoort Uniteds .	3 0*	3 0*	3 0*		3 3*	3 0*
Shebas	2 0†	—	1 9	—	—	1 6*
Simmer Deeps . . .	1 9†	1 6*	1 6*	1 9*	1 9*	1 6*
S.A. Breweries . . .	31 6†	—	32 0†	32 0†	32 0†	—
S.A. Lands	2 8*	2 7*	2 8*	3 0	2 10*	2 9
Springs Mines . . .	27 6*	27 0*	27 3	27 9	28 0	27 9
Sub-Nigels	—	—	11 0†	—	—	7 6*
Swaziland Tins	20 0*	—	—	—	—	—
Trans. Coal Trusts	39 6*	39 0*	41 0	40 9*	—	41 3*
Trans. Lands . . .	11 0*	—	11 6*	—	—	11 6*
Trans. G.M. Ests. .	—	25 0*	25 0*	25 0*	26 0*	26 6
Van Ryn Deeps . . .	53 6	53 3*	55 0	56 9	58 0	56 6*
Village Deeps	34 0†	34 6†	—	—	33 0*	34 0*
Vogel Con. Deeps .	0 8*	0 8*	0 8*	0 8*	0 8*	0 8*
West. Rand Estates	0 9*	—	0 9*	—	0 10*	—
Witwatersrands . . .	56 6*	56 0*	55 6	56 0*	57 0†	—
Wit. Deeps	27 0*	27 0*	27 0*	27 0	27 6	27 0
Wolhuters	11 9*	12 3†	10 6C	10 3	10 3*	10 0*
Zaaiplaats Tins . . .	11 6	11 3*	12 0	12 3*	13 6	13 6†
Union S.A. 3½ p.c. .	—	—	—	—	£97/18/9	—
Union S.A. 4 p.c. . .	—	—	—	—	£100/7/6	—

*Buyers: †Sellers: A ex London; B Odd lots; C ex dividend; D 50 shares.

PERSONAL.

Mr. G. A. Denny is paying the Rand a visit after an absence of some ten years.

* * * *

Mr. Warington Smyth, Secretary for Mines, after serving with the Royal Navy, has resumed his duties with the Department.

* * * *

Sir T. Salter Pyne, C.S.I., M.Inst.C.E., M.Inst.M.E., —formerly on the Rand—whose work as chief engineer to the Government of Afghanistan is so well known, has been appointed staff captain (temporary) at the Ministry of Munitions.

* * * *

The list of certificates issued by the Mines Department for the period ended 30th October, 1915, is as follows:—Mine Managers' Certificates.—Metalliferous Mines: R. Beaumont, A. J. S. Fisher. Collieries: S. S. Atkins, S. R. Campbell. Mine Overseers' Certificates.—Metalliferous Mines: D. J. Bell, E. J. Bolitho, H. A. Burrow, S. W. Collier, A. Curnow, E. N. Craze, J. Gee, A. Gilchrist, J. Jones, J. Lewis, W. A. Moses, M. J. Scott, E. G. Thomas, C. J. Walker. Collieries: W. Donaldson, R. Ferguson, J. Gordon, W. A. Moses, A. T. Ogilvie. Mine Surveyors' Certificates: V. H. Barrett, A. S. Davis, D. B. A. Schuitema, H. P. van Hees.

* * * *

His many friends in South Africa will be glad to hear that Major U. P. Swinburne, of the Seaforth Highlanders, and Chief Inspector of Mines for the Union, is now convalescent after being wounded at Loos. Writing from a Dublin Hospital to a friend on the Rand, Major Swinburne says:—"We had a big fight on September 25, and I was wounded in the attack on Loos, a mining town south of La Bassee, near Souchez. The Black Watch and ourselves led the attack, and we did very well, taking three lines of German trenches, Loos village and Hill 70. I got a bullet in the chest and concussion from a big shell, but nothing dangerous, and I ought to be out of hospital in another few weeks. When I was knocked out we were fighting from house to house in Loos and lost very heavily. All our senior officers were killed or wounded and our colonel is in the next bed to me here. I hope to be out again in a month's time, if I can pass the doctor."

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

October a Bad Month—Since Elections a Better Feeling—Timber Likely to Advance—Good Arrivals of Galvanised Iron—Materials Dropping in Values Through Lack of Support.

There is a decidedly nicer feeling (a responsible man used the word nicer) since the elections were finished and the same Cabinet will continue in office. The election quibbles and squabbles were more serious to the detriment of trade than one could reasonably imagine, as a representative of a firm of substantial mining material house states that October month was the worst on record on the Commercial Exchange, so far as his firm was concerned. As a saving clause he added that the boom in the demand for wire ropes gave a little zest to business, but the totals for general lines were bad, and he felt that his firm's business could be taken as a good gauge and not the exception. A commercial broker's opinion on this subject is that just now the mines seem to be cutting down their requirements to the smallest possible amount, and using from accumulated stocks. He was not surprised at this, because the mines bought extra liberally at the beginning of the year and it is only reasonable that economy should be practised, now that the end of the year is in sight, so that the expenditure on stores should be spread over the whole year, and so make an average. Another reason for business seeming so dull and sluggish is that stocks are coming out oversea exceptionally well, therefore a partial stoppage of the demand means an accumulation in the big stores and yards to such an extent that it is not surprising holders become a little anxious, seeing that payments have to be made or arranged for by the end of the year.

Timber, Deals, and Building Materials.

There is a little flutter amongst timber merchants, as many forecast a shortage of Baltic timber, owing to the extreme difficulty of obtaining shipping at the Baltic ports. Efforts have and are being made by the best and most influential people to remedy this, but so far nothing can be done, chiefly through our enemies making timber contraband of war. Already long lengths of standard-sized deals have advanced to 9¾d. and 10d. per foot, with a tendency for still higher values. South American Oregon timber has also risen in sympathy. However, this kind has not caught on over much with the mines, as it is more difficult to work and it splinters badly as compared with Baltic pine. There are no fears at present of an absolute shortage, as stocks are normal in Johannesburg, and, according to the best advices, the coast timber yards have quite fair supplies. In the second-hand yards the best timber has been well sorted over, therefore little assistance as a substitute can be had in that direction. It so happens that the demand for timber is slow at the moment, but if anything like activity in the building trade occurred, values would quickly advance.

Iron, Steel, Wire Ropes, etc.

The price of decent second-hand iron to-day is about equal to the rate for new iron before the war. Galvanized iron is at present in favour of buyers, without quotable change, owing to the large shipments arriving at the coast, which was purchased favourably some time ago. As compared with the easiness on this side, according to the latest cables, the price at the British factories is firming up. There is an advance also, on the other side, in wire ropes, as a recent business cable gives a rise of nearly 25 per cent. in some sizes and makes. As regards the various hardware goods and sundries, values continue the same, with perhaps a few indications of a drooping tendency, chiefly because there is not sufficient buying to really test the position. The demand for small battery spares is still good, and people holding just what is wanted can practically command their own prices. It appears that Johannesburg lost a nice order for galvanised roofing iron for Rhodesia, simply because the oversea shipments arrived at the coast just in the nick of time, to forward the order direct, instead of from here.

Electrical Supplies.

Owing to the arrival of 300 gross of 3½ in. round blocks it sent the price down sixpence per dozen, which is unfortunate, so far as the Johannesburg makers are concerned, as a nice little industry is being built up here for all kinds of wooden blocks, and similar things in wood work, required in electrical fittings, and now such a big line has come along it quickly hurt prices. British glass shades of every description are getting scarcer and scarcer, and the price has risen from 5s. to 10s. per dozen. These shades, in the first instance, are difficult to get from the makers, and when received, more difficult to obtain shipping accommodation. For example it takes a large crate to pack one gross, and as an ordinary order consists of twenty gross, that represents 25 big crates, which, in these times, is a lot, when so much goods are awaiting on the oversea whaves for shipment. Wire is a little easier, but ordinary tubing is very scarce and a fraction dearer, but not sufficiently so to make a quotable difference in the recognised price. The local contracting business is still very slack, chiefly because a certain class of people say the prices of material are too high, therefore they had better wait, even until the war is over, when things must be cheaper. However, experts do not expect values to drop much until long after the war is finished.

The Motor Trade.

Undoubtedly America is pushing trade in medium class motor cars with South Africa, as it is pretty certain that supplies from Britain will be difficult to obtain; therefore the American hustlers are not losing their opportunity. Already the New York makers are arranging to send the most up-to-date cars here, and they give such tempting financial facilities that are very enticing to purchasers. It is this American competition which is responsible for keeping values in countenance, as the advance in their cars is just under 10 per cent. as compared with pre-war rates. The British cars are much favoured in the second-hand market, and as dealings are chiefly for cash, some very decent bargains are secured. It is likely that British new cars will come out here a little more freely, as it is stated that the Government there will encourage their own makers to keep up their oversea trade and connections. With regard to tyres, the American manufacturers are unusually busy, as the best rubber is cheaper to-day in New York than for many years past, simply because the European Continent is practically shut off from rubber supplies, which obviously forces the surplus to other markets.

Blue Hydraulic Lime and Cement.

The Blue Lime Association has issued a circular to its members, informing them that the railage rates on blue lime have been greatly reduced from November 1st, which will enable makers to quote lower prices for small lots, the railage for which has hitherto handicapped them. Evidently they had a grievance, as the cement people could supply small quantities per rail at the truck rate, and now the lime makers have been placed upon a similar footing as regards railway rates as the cement makers. According to the circular, the price of blue lime will be at per bag of 160 lbs. in one ton lots of 12 bags, or in 11 ton truck loads of 140 bags, delivered free on rail at the nearest station to the various kilns. This blue hydraulic lime is used extensively in the erection of buildings, dams, water furrows, dipping tanks, and has been freely used in the principal buildings throughout South Africa, including the Union Buildings at Pretoria, the new Town Hall, Johannesburg, and many churches and substantial buildings throughout the Cape, Free State and the Transvaal. There is also a specially prepared lime for plaster work which costs 9d. per bag more than the ordinary blue lime. Instructions are given for mixing: Take three-parts clean dritt sand, to one of lime, thoroughly mix into a thick mortar and allow to sour for about ten days, when more water should be, added to allow the mortar to spread easily. This energy on the part of the lime makers is expected to enable them to push their output now the South African cement is in such demand that orders are behind in their execution. In previous notes on the subject of cement it was stated that imported cement is not obtainable; however, our attention has been called to the fact by one firm here that they have a few nice casks on hand of the real Portland oversea article at 34s. 6d. per cask.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle 16s. to 17s. 6d. per 100 lbs.; mild steel bar, 16s. 6d.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 17s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 5d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, antifriction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7½d. to 7¾d., 11 ft. 8¼d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6d., 9 ft. 6¼d., 10 ft. 6½d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3. up to 16 ft., 9d.; over, 9¾d. to 10d. (Oregon, 9¾d.); flooring, 4½ x ¾ and 6 x ⅞, 4¾d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. 2d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling. 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.. Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw and boiled, 21s. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 43s. 6d. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4: motor oil,.6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; carbon lamps, 7s. 6d. per doz.; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Johannesburg Consolidated Investment Company, Limited.

(Incorporated in the Transvaal).

Notice of General Meeting of Shareholders.

NOTICE IS HEREBY GIVEN that the Ordinary General Meeting of Shareholders in the above-named Company will be held in the Board-Room of the Johannesburg Consolidated Investment Company, Limited, on TUESDAY, the 9th NOVEMBER, 1915, at 11.30 o'clock in the forenoon, for the purposes following:—

To receive and consider the Statement of Accounts and Balance Sheet for the period ended the 30th June, 1915, and the Report of the Directors and Auditors thereon.

To elect four Directors in place of those retiring, in terms of the Company's Articles of Association.

To elect Auditors, and to fix their remuneration for the past financial year, and to transact any other ordinary business of the Company.

By Order of the Board.

W. H. MARDALL, Secretary.

Johannesburg, 20th September, 1915.

Swaziland Tins.

The following are the particulars of this Company's output for the month of September, 1915, and we shall be obliged if you will insert same in the next issue of your paper:—Concentrates recovered, 31.964 long tons; estimated profit (taking the price of tin at £140 per ton), £629; to which must be added (being adjustments in respect of previous shipments), £280; total £909.

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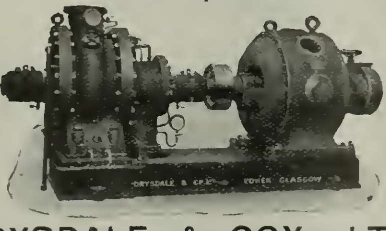

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Shortage of Metals in Austria.

According to a Reuter dispatch from Zurich, dated September 5, a highly significant admission of the growing shortage of war metals in Austria is contained in a semi-official communiqué from the Central Metals Organisation, which was established jointly by the Government and the Ministry of War for the purpose of obtaining metals for the manufacture of munitions. The communiqué frankly states that hitherto the Organisation has never appealed to the public because it has been obtaining all necessary supplies from wholesale quarters, but that since the latter are now exhausted it is forced to invite the public to sell voluntarily their metal goods rather than force the authorities to requisition them. All owners of articles composed of pure nickel, copper, brass and bronze are directed to sell them forthwith to the Metals Organization. This applies to merchants and dealers as well as private persons. This seems to lend colour to the Italian charge that the great bronze statute of Dante at Trent has been broken up and remelted.

Miners' Hours and Wages.

The South African Mine Workers Union Executive has instructed its organisers to take a ballot on the following questions:—(1) Are you in favour of a 44 hour week ? (2) Are you in favour of £1 per day minimum for all underground workers, plus contract or bonus ? The various divisions of the underground workers are asked to answer the following further questions in the event of the above two being agreed to:—Machinemen.—What is the maximum number of machines you would be prepared to supervise ? Hammermen.—What is the maximum number of hammer boys you would be prepared to supervise ? Trammers and Lashermen.—What is the maximum number of tramming and lashing boys you would be prepared to supervise ?

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Subsidences in Colliery Districts.

Dr, A. Eckardt recently published a paper in *Glückauf*, in which he viewed the various theories respecting surface subsidences in colliery districts. The well-known tangent law of Thiriart is first discussed. This theory is based upon the principle that the superincumbent strata behave as prismatic masses falling by their own weight, as was originally maintained by Bauneaux. The theory is examined mathematically. If the strata are inclined at an angle a, it is maintained by this theory that the fracture will follow the direction making with the normal to the plane of the strata an angle , such that
The angle of fracture would thus be independent of the nature of the rock, but is is here held that the theory fails to take into account the conditions under which the prismatic column is held by the surrounding rocks. The reactions thus set up introduce entirely new conditions. Goldreich, from observations of subsidences in the region of Ostrau, concludes that the hard and brittle rocks of the coal measure strata behave differently from the plastic beds of tertiary age. He concludes that in the case of colliery workings covered directly by tertiary strata the volume of the subsided area corresponds approximately to the void produced by the workings. He shows that in the hard strata below the direction of fracture follows the law of Thiriart, but the soft strata above fall vertically over the area of the workings, accompanied by a lateral drag over a larger area determined by the emergence of the normal to the plane of the strata. Where, however, the tertiary cover is thick, other considerations obtain, and Dr. Eckardt maintains that in general the surface sinks by a simple bending of the superincumbent beds. He advances, in proof of this contention, the observed fact that the Zwickau the level of the Lake of Swanus was lowered in level without any penetration of water into the workings below. He accepts the views of Goldreich as to the influence of the area of the workings upon the depth of settlement, but he denies that the rate of excavation of the coal seam has any influence upon the depth. Hausse has advanced another view. He maintains that after removal of the coal, the overlying beds fall into the void, and by breaking up at last fill the empty space. The overlying strata then settle by simple flexure under the influence of gravity, the pressure serving to compress the broken masses in the area which has caved in. He gives a construction for finding the limits the surface subsidence by flexure. Although the procedure is sufficiently simple, it fails, in Dr. Eckardt's opinion, to accord with the results of experience. The author then proceeds to explain his own views upon the mode of propagation of subsidences to the surface. He confirms in part the theory of Hausse outlined above, and shows that the amount of surface subsidence is controlled by the thickness of the worked seam, and by the system of working, viz., whether packing is adopted or not. The nature of the rock is also a factor. If the rock above the seam is hard, the caved-in mass, consisting of broken fragments, will

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offer great resistance to compression, and surface settlement will be correspondingly slow. Shales behave otherwise. Consequently a sandstone roof permits of working without packing, while a shale roof demands complete or partial packing. The plasticity of the superincumbent strata determines whethed the subsidence will be by bending or breaking, and he thus explains why the tertiary cover of the Ostrau region adapts itself to the deformation of the lower beds more regularly than elsewhere. Panel workings if too wide apart may cause difficulties by forming at the surface separate subsidences of an irregular character. It is also well to avoid any changes in the mode of working which would alter the normal lines of subsidence and produce secondary tensions and dislocations. On the whole, it is concluded that the problem is too complex to enable general laws to be established.

Ventilation of Deep Mines.

A paper by Mr. G. Chalmers, superintendent of Morro Velho Mine, Brazil, probably the deepest mine in the world, appears in the *Canadian Mining Journal*, August, 1915. This mine belongs to the St. John Del Rey Mining Company, Limited, and reaches a depth of 5.826 ft. The air is hot and damp, becoming rapidly saturated, and a wet bulb temperature of 86 degs. is commonly experienced. The best working conditions are only possible by leading a large volume of air through the deepest workings, and passing it directly to the upcast without allowing it to circulate to the stopes above. The ventilation of this mine has been progressively improved as the depth of the workings increased. In the first place, natural ventilation was sufficient; later, furnaces had to be adopted during the hot season to assist the natural ventilation. As the mine became still deeper a Capell fan was installed at the top of the upcast "C" shaft to ensure a more constant volume of air. Finally, a Sirocco fan of larger capacity was installed in place of the former, the output of which could be increased by additional power, when required. Besides this, auxiliary fans are used. The temperature gradient in this mine is governed mainly by the progressive increase in rock temperature with depth, which has been ascertained to be approximately 1 deg. Fahr. for every 125 ft. But, in addition to this, there is an increase due to the greater density of the air at increasing depths. This has been investigated, and has been ascertained to be under normal conditions 1 deg. Fahr. for every 180 ft. To these causes must be added the heat due to friction of the air current, heat from machinery, lights, decomposition of mineral matter and the bodies of men and animals. The influence of rock temperature can be diminished by cooling and drying the ventilating current. A cooling plant has accordingly been installed on the surface at the top of the downcast shaft. For working this about 100-horse power is required, in addition to 200-horse power for driving the ventilation current. It is believed that these improvements will enable the workings to be continued to a vertical depth of 7.626 ft. or even more, even although the rock temperature at that horizon would be at least 126.5 degs. Fahr. The results hitherto have been satisfactory, the efficiency of the miners being unimpaired, although it must be admitted that men accustomed to the climate of Brazil would probably be less affected than those used to the conditions found in England.

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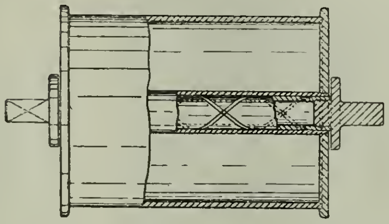

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The Week's Meetings.

KNIGHTS DEEP.

INCREASED PROFITS.

NATIVE LABOUR POSITION IMPROVED.

The seventeenth ordinary general meeting of shareholders in the Knights Deep, Ltd., was held in the board-room, Consolidated Gold Fields Buildings, on October 29. There were present Messrs. D. Christopherson (chairman), F. Leslie Brown, C. Hely-Hutchinson, W. S. Smits, J. E. Kent, D. W. Rossiter, W. H. B. Frank, H. H. Oldroyd, F. H. Cowan, and C. C. White (secretary). There were represented personally and by proxy 594,970 shares out of an issued capital of 743,526 shares.

The Chairman said:—Gentlemen,—From the balance sheet it will be observed that the outstanding debentures had at the end of the financial year been reduced to £24,400. During the current year this debt will be practically extinguished. The redemption of these debentures has been a burden on the profits amounting to £23,000 a year, which amount would cover an extra 3 per cent. dividend on the capital of the company. On the credit side. I think the only item calling for special mention is the increase of £27,700 in the value of stores and materials on hand. This is accounted for by reason that in view of the possibility of difficulties arising in obtaining regular supplies of the most essential stores and material necessary to our operations, it was considered wise to increase the amount on hand, so as to tide over any possible temporary shortage. In addition to this, and to some considerable extent the increase is due to the higher prices which have now to be paid for commodities used by the mines.

Increased Profit.

Turning to the results obtained for the past year. A working profit of £165,111 was made, or, if sundry revenue is added, a total profit of £172,135, an increase of £24,880 as compared with the corresponding figure in last year's accounts. The improved native labour position enabled the management to put through the mill an increased tonnage of 59,620, the average gold recovery being 14s. 11·8d., or an increase of 3½d. per ton as compared with last year. Working costs are higher by 1½d. per ton milled, due to a large extent to heavy expenditure on shaft maintenance and the increase in the development footage, which amounted to 8,607 feet as compared with 2,226 feet for the previous year. The ore reserves show an increase of 147,000 tons fully developed ore, and now stand at 2,627,000 tons of an average value of 4·25 dwts. This figure does not include reclamation tonnage, from which source 57 per cent. of the ore milled during the year was drawn. Most of the development for the year was advanced in the lower levels of the eastern section, where I am glad to be able to report, satisfactory reef widths and values are being met with.

Sand Filling.

At the last annual meeting I spoke of the position of sandfilling, and foreshadowed an expenditure of some £11,000. Owing to difficulties encountered in putting down the boreholes, this work has been considerably delayed, but it is hoped that better progress in this respect will be reported next year. At the Connor shaft the borehole has a further 90 feet to go, and at the Robertson shaft 300 feet.

The following figures show how much the native labour position has improved:

Number of natives in the compounds, 31st July, 1914, 4,786.

Number of natives in the compounds, 31st July, 1915, 5,920.

Number of natives in the compounds, 22nd October, 1915, 6,395.

With prospects of a better labour supply being assured for the time being, it has been found advisable to increase the percentage of hammer work underground by the replacement of machines. The recent rapid increase in labour has no doubt had the effect of reducing the average efficiency per boy, but, as these boys become trained, this will be largely overcome; in fact the tonnage crushed for this month (which will probably be in the neighbourhood of 110,000 tons) indicates that an improvement is already taking place. Should the supply of native labour continue as at present, there is every reason to hope that the prospects for the current year are better than has been the case for some time past. We have been told repeatedly by our technical advisers that without a plentiful supply of native labour the management cannot be expected to get the best results from this low-grade mine, and it is from want of a full complement of such labour, for the past few years, the manager and his staff have been severely handicapped. On the other hand, one must bear in mind that the price of stores and mine material has markedly increased and may yet further increase. Owing to large stocks of certain lines having been bought at the commencement of the war, at prices much below current prices, the working costs have not yet by any means felt the full effect of the rise in prices; but, as these lines become exhausted, the incidence of the increased prices will be more noticeable. Also it must be remembered that many of the most efficient members of our staff and other employes have gone on active service, which increases the difficulty of providing for the very necessary close supervision of mine work.

Value of the Fine Ounce.

In addition to this, under the new arrangement with the Bank of England we have had to reduce the estimate of the net realisable value of a fine ounce of gold by about 6d. per oz., which may be expected to affect our future profits by approximately £450 per month. This is not due to the Bank of England paying any less for the gold, but on account of the increase in the freight, insurance and charge for war risks, for which a charge of 25s. per cent. is at present made. The arrangements made get over all difficulties as regards financing current operations, as mining companies are enabled under the arrangement to realise the full value of the gold without delay. In this connection, the help of the Bank of England has been of the greatest value to the industry; without such help it would have perhaps been impossible to continue the output of gold, the necessity of which has been urged by the highest Imperial and Union authorities. Were it not for the insistence on this necessity, I have no hesitation in saying that many would not be here to-day, and one sympathises to the full with those of our employes who are only too anxious to assist the good cause of our country more actively, but cannot be spared so long as it is certain that the output of gold is so essential. As referred to above, a large number of your employes who could be spared are on active service, whilst those who are left behind have not only given their loyal assistance and co-operation in their work, but have contributed with great generosity to the various war funds. During the twelve months ended 30th September the employes on the mine of the Knights Deep have subscribed out of their wages no less than £4,561.

Since the close of the financial year negotiations have taken place whereby it is proposed to allow the Witwatersrand Gold Mining Company to work on Knights Deep's behalf an area, equal to approximately one-fourth of a claim, situated on the extreme north-east corner of your property for a payment of £3,500, as this company's portion of the profits made from that area. This small area, we are advised by our technical advisers and the manager, would be expensive for this company to work themselves, and they do not hesitate to advise that the above arrangement be entered into with the neighbouring company. I now beg formally to move the adoption of the report and accounts.

Mr. Rossiter seconded the motion, and it was carried.

The appointment of Mr. C. Hely Hutchinson to the board was confirmed, and the retiring directors, Messrs. F. Leslie Brown and D. Christopherson, were re-elected.

Messrs. Douglas, Low and Co. and Mr. Charles Stuart were re-elected auditors, and their remuneration for the past audit was fixed at 200 guineas each.

WESTERN RAND ESTATES.

Surplus Water at the Mine.

The 12th ordinary general meeting of shareholders of the Western Rand Estates, Limited, was held at Standard Bank Chambers on November 1. In the absence of the chairman, Mr. J. Waldie Peirson, Mr. Tristram Wooldridge presided. There were also present Messrs. J. M. Pemberton, J. Wege, E. J. Pullinger, G. F. Wills, J. H. Houghton, S North, A. R. Peirson, H. McDonald, C. J. Watson, Dr. D. J. Peirson, and C. E. Peirson (secretary), representing 239,885 shares of 10s. each out of a captial of £202,500.

In moving the adoption of the directors' report and audited accounts for the period ended June 30th, 1915, the Chairman said:—The continuance of the dreadful war which is still raging in Europe prevents any financial arrangements being made at the present time. The satisfactory termination of hostilities in South-West Africa is a matter for congratulation, and, in common with the rest of South Africa, we acknowledge a debt of gratitude to General Botha and General Smuts and the magnificent soldiers associated with them, who have by prompt and splendid action done so much to bring about the success. I regret the Government have not yet accorded us permission to dispose of the surplus water at the mine. It is to be hoped that now the Government may have more time for the consideration of local affairs it will speedily reconsider this matter and remove the great hardship now imposed upon the company. For the convenience of shareholders a transfer office has been reopened in town. Every care is being taken to preserve the buildings and valuable machinery upon the property as economically as efficiency will permit.

The report was adopted.

The directors were re-elected.

Messrs. G. M. Pemberton and Ernest Danckwerts were reappointed auditors.

SAKALAVA OILS.

Reconstruction Scheme.

The annual meeting of shareholders of the Sakalava Proprietary Oils was held at the Grand National Hotel on Saturday, October 30, Mr. Lewis A. Stewart presiding over a large attendance.

The Chairman moved the adoption of the report and accounts, and said a promise had been obtained from the Government that as soon as war conditions allowed such matters as the revising of the tariff on oil-drilling plant would be seriously considered. In fact, representations had already been made to the Minister of Colonies in Paris.

Questions in regard to the property were put by some shareholders and answered by Mr. Stewart, who afterwards placed a reconstruction scheme before the shareholders. The development of the company, he said, had reached an exceedingly interesting stage, and it would be a thousand pities if they were compelled to close down for lack of further capital. The present capital was £82,714 in £1 shares. It was proposed to reduce it to £41,357, to provide for the issue of 82,714 shares of 10s. each, and it was then proposed to increase the capital to £100,000 in 200,000 shares at 10s. These shares were to be allocated as follows: 82,714 to present shareholders, 50,000 offered for subscription, and 67,286 held in reserve.

The report and accounts were adopted. The directors' report showed that oil had been struck in No. 2 well at 53 feet, 103 feet, and 666 feet.

RAND KLIP, LIMITED.

AWAITING NORMAL CONDITIONS

DISTRICT'S POTENTIALITIES.

At the annual meeting of shareholders of the Rand Klip G.M. Company, Ltd., on November 3, Colonel W. Dalrymple presided, and the others present were Messrs. W. J. Gau, W. H. B. Frank, F. E. Scriven, W. P. Fisher, S. M. Nelson, J. Andrew Cohen, Geo. W. Austin and L. S. Raymond, secretary. The report and accounts were adopted, and Messrs. W. J. Gau and A. G. Gill were re-elected to the directorate.

The Chairman, in moving the adoption of the report, said:—The accounts show that the cash on hand, after providing for sundry creditors of the company, amounted to £15,344. This reflects an improvement of slightly over £2,000 when compared with the cash position last year, mainly due to the realisation of certain stores and to the reduction of the amounts standing against sundry debtors. You will notice also that the shares in the Witwatersrand Native Labour Association have disappeared from the balance sheet. This is due to the fact that on the reorganisation of the capital of that association this company took the opportunity of disposing of its shares, thereby ceasing for the time being its membership of the association. The capital assets of your company remain the same as last year, and stand at practically the same figure on the balance sheet. The expenditure for the year, comprising caretaking, administrative charges and insurance, amounted to £1,093, and contributions to the miners' phthisis fund to £304, making a total of £1,397, against which there was revenue amounting to £1,476, showing on balance a reduction of £79 in the general expenditure appearing in the balance sheet.

Development.

I may perhaps review the development work which has already been done on your property. As the early prospecting along the outcrop proved very disappointing, both in widths and values, the board had to endeavour to ascertain whether the reef made in width and value at depth, consequently the position of the mynpacht was decided upon after a methodical policy of diamond drilling had been carried out, and it is needless to say the site was eventually chosen on the best indications obtained as regards widths and values of the reef at the points of intersection. Two five-compartment vertical shafts were started. Of these, one—the west shaft—was sunk to a depth of 555 feet, and then stopped to allow of the concentration of the available cash working capital and labour force on the east shaft. This shaft encountered the reef at a depth of 1,792 feet 6 inches, and six drive faces and several winzes were being advanced at the date of closing down. The west shaft, however, has still some 1,300 feet to be sunk, but this should be straightforward work as the bad ground which so delayed our early operations had, in our opinion, been successfully passed through and secured previous to closing down. On the whole, I think we may safely say that the position is such that, when we reopen, we can develop our large holding fairly rapidly and without undue delay. When the mine was closed down, 2,409 feet of shaft sinking had been completed, and footage to the extent of 6.177 feet had been driven, risen and sunk, of which 4,395 feet were on reef, and the average value of the reef exposures were 4.6 dwts over 21.7 inches. The values encountered on the third or lowest level of the mine showed considerable improvement on results from the upper levels, the 235 feet sampled giving an average assay value of 8.4 dwts. over 27.4 inches. Owing to the approaching exhaustion of working capital, all development work was suspended on the 31st of March, 1913. The total area prospected to the date of closing down amounted to some 20 claims, or approximately 2 per cent. of the mynpacht area to which your company would be entitled on proclamation of the farm. That is practically the whole of the information that we are able to give you with regard to the values that have been actually encountered in the work of development round about the eastern shaft of your property.

Surrounding Properties.

The workings of our newest neighbours on the strike—the Modder B—are still some one and a quarter miles from our boundary, and moreover, they are separated from us by a block of Government ground of about 600 claims. The same position applies to the nearest working property on our dip, the Geduld, where the workings are also about one and a quarter miles distant, with the Cloverfield property intervening. We cannot, therefore, attach any direct importance to the values being disclosed by the workings of these properties, as they proceed in our direction, but it is nevertheless gratifying to note that most encouraging results have been obtained from them. While we are not in a position to make any deductions from the values obtained in the nearest development points to us, I do think we can draw great encouragement from the general results obtained from the whole of this Far East Rand district, in which our mine is situated. We find those companies which are actually working have, during the last two or three years, enormously increased the value of their properties, by systematic and straightforward development, and those who are acquainted with the occurrence of values in this particular area, know that there is no system of pay-shoots to be followed, but that patches, often covering large areas, must be searched for. There is no reason to believe, from actual information obtained, that your property should not average in the matter of value something in proximity to its neighbours. The values which were disclosed by the small amount of development done on the third level in the eastern section tend to show that we may have been on the fringe of one of the payable patches to which I have referred, when our financial position forced us to close down operations. The local conditions, of course, necessitate a large claim-holding—that we have got. It will therefore be patent to shareholders that the possibility of success only lies in the provision of ample funds for thorough development on a large scale. When normal conditions are restored, I feel sure we shall have a good case to present when endeavouring to obtain the guarantees necessary to raise the amount required, especially when the potentialities of this district are fully realised. Meantime, the property is being well maintained, and all plant and machinery kept in good order; and the revenue received a little more than meets the expenditure, therefore your capital cash reserve is not at present being encroached upon.

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Engineering Notes and News.

PREPARATION OF LARGE-TYPE BOILERS FOR TEST—II.

[By H. Marten.]*

Immediately before a boiler test, at least one of the pyrometers is immersed in water with a standard mercury thermometer, and any small error owing to possible slight alterations in the instrument due to transport, etc., is at once easily corrected to within 1-5th of a degree by means of an adjustable sliding resistance clip. This method of correction has been found accurate enough to render the usual method of comparison at the temperatures of melting ice and saturated steam quite unnecessary. Considerable trouble is thus avoided, as ice is neither easily obtained nor retained in a boiler house in this country. I would emphasise the facts that this apparatus reduces the staff of temperature observers to a minimum, eliminates all personal errors due to different observers, and is quite independent of the distance of the pyrometers from the measuring instrument. The various pyrometers are arranged as follows :—

(a) The atmospheric temperature is obtained by means of any pyrometer not needed for another purpose—in this case one of the steel tube type. (b) and (c) Steel tube pyrometers about three feet long are used in closely fitting steel pockets, let into the economiser inlet and outlet pipes respectively, ensuring a good flow of water around a large surface of pocket. (d) and (e) The economiser inlet and outlet flue gas temperatures are also taken by means of similar steel tube pyrometers, having a temperature range up to 500°C., the former projecting into the economiser through a small hole arranged for cleaning, and resting on the bottom row of tubes, the latter projecting through a gland fitted to the boiler uptake flue. (f) and (g) The special pyrometers obtained for taking the steam temperatures were found to be of unsuitable mechanical construction to stand the high steam pressures. Steel pockets were therefore made and fitted to project into the delivery pipe and superheater header, and have given quite satisfactory results, temperatures of over 500°C., having been observed. Trouble was found owing to broken coils, successively in two pyrometers in the steam delivery and, and was located to vibration of the pipe. A suggestion has been made to the makers of the instruments with the object of getting over this defect. (h) and (i) The superheater inlet and outlet temperatures were taken by means of porcelain tube pyrometers having a range up to 1,200°C. The pyrometers project through closely-fitting iron sleeves screwed into small tube-cleaning doors at the side of the superheater, considerable care having to be taken to prevent breakage.

(11) The furnace temperatures are observed by means of a Féry radiation pyrometer. This instrument is simply sighted at, and focussed on to, the hottest part of the surface which is visible through the side inspection door. The radiant heat waves are concentrated by a suitable reflector on to a small thermo-couple. This is connected by flexible leads to a sensitive milli-voltmeter, on which a reading is directly obtained, as the voltmeter scale is calibrated in degrees centigrade. This apparatus is also available for inspection.

(12) The draught in the uptake flue is obtained by means of a ¾ in. iron pipe projecting through a flange to the centre of the flue, and connected by means of ¼ in. piping to a sloping magnifying draught gauge on the test table.

(13) The draught over the furnace is also obtained by means of a ¾ in. iron pipe projecting into the furnace over the arch ; its end turned in the direction of the flow of the gases near the edge of the arch. This pipe is lagged with asbestos and fireclay to protect it from th intense heat, and is connected by ¼ in. piping to a double-liquid magnifying draught gauge on the test table.

(14) The sampling of the gases is done by means of a pipe let into the uptake flue, similarly to that for taking the uptake draught, and connected by ¼ in. piping and a short length of rubber tubing to an "Orsat" gas sampling apparatus on the test table. As a rule, when using the "Orsat" apparatus, the CO_2 percentages only are taken, about four times an hour. I have now described the test equipment as far as permissible in a paper of this kind, but shall be glad to supply as far as possible any other details which may be called for during the discussion.

I will now give some details of a recent boiler test at Brakpan carried out with this apparatus. In expressing the results of these tests I have followed Mr. G. M. Clark's choice of units, so that all energy units are expressed in kilowatt hours per pound of such substance which is for the time being the vehicle of the energy, whether water, steam or coal. Neither the British thermal unit nor the calorie, therefore, appear in this paper, and thus the results themselves may not be evident at sight to those who are only accustomed to the older units. I have, moreover, dropped altogether the old method of expressing the result of a boiler trial in terms of the number of pounds of water evaporated from and at 212°F., for this piece of information is of little value to anyone. What is required is the evaporation in pounds of water under the conditions prevailing, regarding pressure and temperature, and the efficiency with which the process is carried out. The production of steam should be looked upon not as a matter of the production of a new material—steam—from an already existing one—water—but simply as an energy transformation problem, for which the boiler and furnace form the transformer, the coal and air form the incoming vehicle of the energy, and the steam the outgoing vehicle. The final statement of the efficiency of the boiler tested—

$$\frac{7.21 \times .386}{3.48} = 80\%$$

(where 7.21 is the evaporation in pounds of water per pound of fuel, .386 is the energy in kilowatt bours per pound taken in by the water stuff from the temperaturs of the feed water to the crown-valve-discharge condition of the steam, and 3.48 kilowatt hours is the energy per pound of coal) summarises the results in the shortest possible manner. The energy "from and at" is .283 kilowatt hours per pound, so that if anyone is curious to obtain results in that form, it is an easy matter for them to obtain the factor of evaporation. These units have been used in the V.F. and T.P. Co. for some years, and, as the result of my own experience, I must assure this Institution that, certainly in power station work, these methods clarify and emphasise the important points of the results obtained in a most surprising manner. The test was carried out with Messrs. Babcock and Wilcox representatives in order to see that the contract conditions were fulfilled, on April 14th, 1915, beginning at 9.30 a.m. The contract required that the boiler should evaporate 36,000 pounds per hour with 1 in. draught in the uptake for a period of ten hours, and 40,000 pounds per hour with 1¼ in. draught for four hours, and higher rates of evaporation for short periods; these tests to be carried out in succession. It was agreed that the boiler should be operated at 1 in. draught, and it was found that the evaporation for 6½ hours was 43,450 pounds per hour. There is thus no doubt that the boiler fulfils all the evaporative conditions, and it was unnecessary to continue the test for a longer period or with higher draught. The test was run on Coronation coal of energy value 3.48 kilowatt hours per pound. The contract states that the energy value should be between 3.28 and 3.46 kilowatt hours per pound, so that the fuel used was fractionally better than the upper limit. The average weight of coal burned per hour was 6,020 pounds, so that the average evaporation was 7.21 pounds of water per pound of coal. The grate surface is 252 square feet, so that the rate of combustion was 24 pounds per square foot. The temperature of the feed water to the economiser was 46°C., as against the specified value of 38°C., but this small difference of 8°C. can have no appreciable effect. The average boiler pressure was 204 pounds per square inch, and the final temperature of delivery of the steam 405°C. This latter was obtained with the mixing valve in its highest position, but tests carried out on another occasion showed that a movement of the mixing valve towards the vertical would reduce this delivery temperature by 40°C. It may, therefore, be taken that the boiler will deliver superheated steam at 360°C., and that the test was carried out under specified conditions. The energy in the steam delivered was 0.410 kilowatt hours per pound, and of the feed water 0.024 kilowatt hours per pound, so that the increase of energy was 0.385 kilowatt hours per pound. As 7.21 pounds of water were evaporated per pound of coal, and the coal had an energy value of 3.48 kilowatt hours per pound, the efficiency is

$$7.21 \times 0.386/3.48 = 80\%$$

The contract asked for an efficiency of 78 per cent. when the boiler was evaporating 36,000 pounds per hour, and of 73 per cent. at 40,000 pounds per bour, but the efficiency for higher loads was not specified. The result of the test shows that these requirements have all been fulfilled.

(To be continued.)

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REPORT OF THE DIRECTORS.

For the Year ended 31st July, 1915.

Submitted at the Seventeenth Ordinary General Meeting of Shareholders, held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, on Friday, 29th October, 1915, at 11 o'clock in the forenoon.

Gentlemen,

Your Directors beg to submit their Report, together with the audited Accounts, for the year ended 31st July, 1915.

CAPITAL.

The Capital of the Company, which is unchanged, is £743,526, in 743,526 shares of £1 each, all of which have been issued fully paid.

DEBENTURES.

Further £22,700 Debentures were redeemed during the year, leaving £24,400 Debentures outstanding at 31st July, 1915.

The drawing that will be made during the current year will practically extinguish the Company's debenture debt.

PROPERTY.

The area of the Company's property, on which claim licences and mynpacht dues are paid, is equal to a claim area of 506.543 claims, which is the same as last year. These claims are situated partly on the farm Elandsfontein No. 11 and partly on the farm Driefontein No. 12, and are held at to 97.165 claims under mynpacht title and 409.378 claims under claim licences.

It is estimated by the Superintending Engineer that the intact claim area at 31st July, 1915, was equivalent to 368.293 claims, and that, in addition, a considerable tonnage of ore is available as reclamation from areas already stoped out.

OPERATIONS.

The Superintending Engineer's and Manager's Reports, which are attached, give a *resume* of the operations conducted at the mine during the period under review.

ACCOUNTS.

It will be observed from the Working Expenditure and Revenue Account that the profit on working for the year, after making allowance for the expenditure of £3,011 6s. 7d. on renewals and replacements of machinery, plant, buildings, etc., amounted to

			£165,111 2 0
Add : Sundry Revenue			£7,024 0 5
Less : Contributions to the Miners' Phthisis Compensation Fund; expenditure due to the present war; amounts written off; provision for Profits Tax and special war levy, and debenture interests, etc.			19,637 5 5
Leaving a total credit to Appropriation Account of			£152,497 17 0
Add : Balance at Credit of Appropriation Account at 31st July, 1914			100.608 7 10
			£253,106 4 10
From which has been appropriated :—			
For redemption of Debentures and capital expenditure		£22,861 19 2	
For Dividends Nos. 19 and 20 of 5 per cent. and 7½ per cent., respectively, declared during the year		92,910 15 0	
For fund for additions to and renewals of machinery, plant and buildings	£9,294 1 6		
Less : Expended on renewals and replacements during the year and charged to Working Expenditure and Revenue Acount ...	3,011 6 7		
		6,282 14 11	
			122,025 9 1
leaving a balance at credit of Appropriation Account at 31st July, 1915, of			£131,080 15 9

INVESTMENTS.

The Company's investments and interests in other concerns, which stood in the books at £46,531 7s. 9d. at 31st July, 1914, now stand at £45,217 1s. 3d., or a reduction of £1,314 6s. 6d., which is accounted for as follows :—

160 Shares of £1 each (8s. paid) in the Witwatersrand Native Labour Association, Ltd., disposed of during the year	£64 0 0
Dividends received during the year ended 31st July, 1915, on Company's holding in Breyten Collieries, Ltd., and credited to Investments	1,250 6 6
	£1,314 6 6

RESERVE GOLD.

At 31st July, 1915, the gold in reserve amounted to 239 fine ounces, of a value of £1,001 16s. 2d.

DIRECTORATE.

During the year Mr. R. Parnell was appointed a Director of the Company, in the place of Mr. F. D. P. Chaplin, resigned; and on the resignation of Mr. Parnell, which took place since the close of the financial year, Mr. C. Hely-Hutchinson was appointed to fill the vacancy.

You will be asked to confirm these appointments, and to appoint two Directors in the places of Messrs. F. Leslie Brown and D. Christopherson, who retire by rotation, but are eligible and offer themselves for re-election.

AUDITORS.

You will also be asked to fix the remuneration in respect of the past year's audit, and to elect two Auditors in the places of Messrs. Douglas, Low and Co., and Mr. Charles Stuart, who retire in accordance with the provisions of the Articles of Association, but, being eligible, offer themselves for re-election.

GENERAL.

Mr. G. A. Chalkley continued to act as the Manager of the Company's mine during the past year, and your Directors wish to record their appreciation of the services rendered by him during that period.

D. CHRISTOPHERSON (*Chairman*),
A. G. GILL. Directors.

THE CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA, LTD.,
Secretaries.
per G. C. WHITE.

Johannesburg.
12th October, 1915.

The Knights Deep, Limited—continued.

BALANCE SHEET, AT 31st JULY, 1915.

Dr.

To Capital—			
Issued Capital as per Balance Sheet at 31st July, 1914—			
713,526 Shares of £1 each, fully paid			£713,526 0 0
,, 5½ per cent. Debentures issued at par		£100,000 0 0	
Less purchased and redeemed to date		375,600 0 0	
			24,400 0 0
,, Reserve Account—			
As per Balance Sheet at 31st July, 1914			327,381 17 10
,, Revenue appropriated for redemption of Debentures and Capital Expenditure—			
Amount as per Balance Sheet at 31st July, 1914		359,962 12 10	
Add amount appropriated during the year for redemption of Debentures & Capital Expenditure as detailed in the Appropriation Account	£22,801 19 2		
Amount transferred from Fund for Additions to and Renewals of Machinery. Plant and Buildings	5.280 0 1		
		28,081 19 3	
			388,044 12 1
			£1,483,352 9 11
,, Fund for Additions to and Renewals of Machinery, Plant, and Buildings—			
Amount appropriated during year		9.294 1 6	
Less charged to Working Expenditure and Revenue Account	£3,011 6 7		
Written off for Additions during year	5,280 0 1		
		8,291 6 8	
			1,002 14 10
,, Reserve Gold			1,001 16 2
,, Sundry Creditors—			
Open Accounts for Wages, Stores, and Sundries		59,922 9 9	
Sundry Shareholders' Dividend Account No. 20 of 7½ per cent.		55,764 9 0	
Receiver of Revenue—provision for Profits Tax and special War Levy		4.880 0 0	
			120,566 18 9
,, Dividends and Debenture Interest unclaimed, including Debenture Bonds drawn for payment not yet presented, with interest accrued			3.338 1 5
,, Balance from Appropriation Account			131,080 15 9
CONTINGENT LIABILITIES.			
Balance payable on uncompleted contracts		£505 0 0	
Amounts uncalled on Shares held—			
12s. per share on 2,940 Witwatersrand Co-operative Smelting Works, Ltd., shares		1.764 0 0	
8s. per share on 1,480 Witwatersrand Native Labour Association, Ltd., shares ...		592 0 0	
Native Recruiting Corporation, Ltd.—Deposit Account—			
12s. 6d. per native uncalled on complement of 7,047 natives		4,404 7 6	
		£7,265 7 6	
			£1,740,342 16 10

Cr.

By Property at cost—		
506.543 Claims on farms Driefontein No. 12 and Elandsfontein No. 11, as per Balance Sheet at 31st July, 1914		£321,682 0 0
It is estimated by the Company's Superintending Engineer that the intact claim area at 31st July, 1915, was equivalent to 368.293 claims, and that in addition, a considerable tonnage of ore is available as reclamation from areas already stoped out.		
,, Expenditure to date on equipment of Property, less amounts written off—		
Shaft Sinking	£301,728 9 5	
Surface Plant	235,093 10 8	
Underground Plant	128,591 3 1	
Workshops and General Buildings	106,902 13 9	
Ore Reduction Plant	375,526 16 5	
Roads and Surface Improvements	3,027 7 6	
Water Purification Installation	2,084 9 5	
Sand-filling Plant	1,268 17 10	
Water Disposal Plant . , ...	160 10 9	
Water-cooling Arrangements ...	889 14 7	
Metallurgical Department Laboratory	96 16 6	
		1,158,670 9 11
		£1,483,352 9 11
,, Survey Instruments		98 17 5
,, Livestock, Vehicles and Harness, including motor cars		498 0 0
,, Furniture		795 2 2
,, Stores and Materials on hand, including Machinery for sale		65,974 17 3
,, Payments in advance—		
Native Labour Recruiting Expenses	£6,134 1 1	
Licences, Insurance and sundries	2,937 1 8	
Sundry expenditure in suspense	167 1 4	
		9.238 4 1
,, Investments and Interests in other concerns at or under cost—		
34,017 Preference Shares of £1 each in Victoria Falls and Transvaal Power Company, Limited (fully paid)	42,571 8 9	
7,875 Ordinary Shares of £1 each in Victoria Falls and Transvaal Power Company, Limited (fully paid)		
11,114 Shares of £1 each in Breyten Collieries, Limited (fully paid)		
1,480 Shares of £1 each in Witwatersrand Native Labour Association, Ltd. (12s. paid)		
2,940 Shares of £1 each in Witwatersrand Co-operative Smelting Works, Limited (8s. paid)		
69 Shares of £1 each in Native Recruiting Corporation, Ltd. (fully paid)		
200 Shares of £1 each in Rose Deep, Limited (fully paid) ...		
Native Recruiting Corporation, Limited—deposit of 7s. 6d. each on the total complement of 7,047 natives, being part of total liability under agreement of £1 per native	2,642 12 6	
		45,217 1 3
,, Sundry Debtors		19,879 10 11
,, Gold in transit		62,675 17 4
,, Cash at Bankers, London and Johannesburg—		
For Dividends and Debenture Interest unclaimed, including provision for unpaid Debenture Bonds drawn for payment, with accrued interest		3.392 17 2
,, Cash—		
At Bankers, London, Johannesburg, and Germiston, and on hand at Mine		49,219 19 1
		£1,740,342 16 10

The Knights Deep, Limited—continued.

Dr, Working Expenditure and Revenue Account for the Year ended 31st July, 1915. Cr.

To Mining Expenses—			
Mining and Pumping	£146,312 9 10		
Development	27,368 19 8		
		£173,681 9 6	
.. Reduction Expenses—			
Breaking, Sorting and Transport of Ore	32,617 5 1		
Milling Expenses ..	50.605 17 11		
Tube Milling Expenses	31,816 15 0		
Cyaniding Sand Expenses	38,738 18 7		
Cyaniding Slime Expenses	29.144 5 3		
		185,953 1 10	
.. General Expenses—Mine		42,787 14 3	
.. Expenditure on Renewals and Replacements of Machinery, Plant and Buildings		3,011 6 7	
., Head, London, and Paris Offices' Expenses		8,204 17 11	
			£713,638 10 1
.. Balance, being Profit on Working carried down			165,111 2 0
			£878,719 12 1
To Miners' Phthisis Compensation Fund—			
Levies under Miners' Phthisis Act for year ended 31st July, 1915		£4,978 0 8	
.. Expenditure due to war		5,567 10 3	
.. Amounts written off for depreciation of Livestock, Vehicles, Furniture, etc., less sundry credits		1,299 4 6	
,. Debenture Interest, including Guarantors' remuneration and Trustees' fees for the year ended 31st July, 1915		2,912 10 0	
,. Profits Tax—			
Provision for year ended 31st July, 1915	£3,230 0 0		
Provision for special war levy, in terms of Act 24 of 1915	1,650 0 0		
		4,880 0 0	
			19,637 5 5
.. Balance carried to Appropriation Account			152,497 17 0
			£172,135 2 5

By Gold Account	£878,646 15 6	
Add Rebate of Freight	102 16 7	
		£878,749 12 1
		£878,749 12 1
By Balance brought down		£165,111 2 0
.. Rents received, *less* maintenance	£1,610 4 4	
.. Interest, Commission and Exchange	1,064 11 3	
,. Sundry Revenue	4,349 4 10	
		7,024 0 5
		£172,135 2 5

Dr. APPROPRIATION ACCOUNT. Cr.

To Revenue appropriated for redemption of Debentures and Capital Expenditure		£22,801 19 2
Amount appropriated for redemption of Debentures during year	£22,700 0 0	
Expenditure on Shaft-sinking during year	101 19 2	
.. Dividends		92,940 15 0
Dividend No. 19 of 5 per cent., declared 15th December, 1914	37,176 6 0	
Dividend No. 20 of 7½ per cent., declared 21st June, 1915	55,764 9 0	
,, Fund for Additions to and Renewals of Machinery, Plant and Buildings		6,282 14 11
Further provision as voted—amount equal to 10 per cent. of Dividends Nos. 19 and 20 ...	9,294 1 6	
Less—Amounts expended on Renewals and Replacements and charged to Working Expenditure and Revenue Account, as above	3,011 6 7	
,. Balance carried to Balance Sheet		131,080 15 9
		£253,106 4 10

By Balance at 31st July, 1914	£100,608 7 10
.. Balance from Working Expenditure and Revenue Account for the year ended 31st July, 1915 ..	152,497 17 0
	£253,106 4 10

THE CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA, LIMITED,
Secretaries,
per G. C. WHITE.

D. CHRISTOPHERSON
(Chairman),
A. G. GILL,
Directors.

REPORT.

To the Shareholders of THE KNIGHTS DEEP, LIMITED.

We report that we have examined the above Balance Sheet with the books and vouchers of the Company in Johannesburg for the year ended 31st July, 1915, in which have been incorporated the audited accounts received from London, and have obtained all the information and explanations we have required as Auditors. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us, and as shown by the books of the Company.

DOUGLAS, LOW & CO.
(Incorporated Accountants).
CHAS. STUART
(Chartered Accountant),
Auditors.

Johannesburg, 23rd September, 1915.

THE SOUTH AFRICAN

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CONTENTS.

PAGE

Notes and News 237

Topics of the Week:

The "Johnnies" Annual Meeting 239

The Greater Robinson Deep and the Critics ... 240

The Valuation of Gold Mining Shares—II. 241

The Position of Glynn's Lydenburg 242

The Flotation Concentration of Ores 243

The Dumb-bell Tube Mill 244

Transvaal Makes Record Gold Output for October ... 246

Rhodesian Section:

Latest Mining News 248

The October Output: Group Returns 249

The Week in the Mining Material and Engineering Trades 250

The Week in the Sharemarket 252

Company Meetings:

"Johnnies" 254

Robinson Deep 259

Engineering Notes and News:

International Engineering Congress 263

Interesting Test of New Shaft Roller 263

The Recent Munition Conference 264

Notes and News.

Diamond Trade Recovering. The depression in the Amsterdam diamond industry following the outbreak of the war is apparently passing away, reports the American Consul at Amsterdam. The prices of diamonds fell about 20 per cent., but are now about normal again. No polished diamonds can be exported from the Netherlands to the United States or other countries without a certificate showing that they were polished in the Netherlands. The certificate is made necessary by the restrictions upon exports imposed by the British blockade.

* * * *

Lead. There were shipped in 1914 from the Transvaal £1,396 worth of galena, and the production latterly appears to have been anything up to 200 tons per month, valued at about £10 per ton. Mining was carried on somewhat spasmodically during 1914, when returns began to be sent in again after a long interval of non-production. Supplies are coming now from the Kalkheuvel range, which can be seen across the valley north of the Rand, and at present prices there seems to be a profitable opening for small concerns. The Zeerust district, which was the main source of galena supply a few years ago, has apparently ceased to be a factor in the export trade. In view of the conditions of to-day and the possibilities of to-morrow, it is obviously the duty of the Government to encourage the development of lead-producing areas.

* * * *

Metal for Germany. Messrs. R. H. Merton and Co., who made a claim for £5,000 in respect of freight in the action brought in the Prize Court by the Crown, which asked for the condemnation of 4,732 tons of zinc concentrates, are well known in South Africa, as some of our mines used to sell their tin to them. The goods were condemned as enemy property. The President of the Court stated that Messrs. Merton could not recover the £5,000 they claimed, and that " for whomsoever the £5,000 was paid Mertons' made the payment in order to try and preserve the goods for the owners, whom they knew to be enemies. To launch such a claim," declared the President, " much assurance was needed, and to persevere in it showed a reckless want of appreciation of the possible consequences."

* * * *

Portland Cement. The Chairman of the Associated Portland Cement Manufactures, Ltd., in referring at the annual meeting to the South African concern, said: " Our other manufacturing interests abroad are confined to our substantial shareholding in the company owning the works in South Africa. We have every reason to hope that this investment will prove a remunerative one, and that we shall secure a fair return from it in the current financial year. Partly owing to the great diminution in the imports of foreign cement into the Union of South Africa there is a good demand for cement, notwithstanding the curtailment, due to the war, of constructional business. It was contemplated at the outset that the works in which we are interested should ultimately have double the capacity of the first unit of plant, and when erecting the first portion provision was made for a good deal of the extra equipment which that increase would involve. Now that we have evidence that the demand for cement is likely to justify it, and that buyers have realised that the quality we are manufacturing corresponds to that which they have always received from the Associated Co., we have felt it right to place orders for the balance of the plant, and in due course, probably well within the next twelve months, the whole should be installed and in running order."

* * * *

Sutherland Reef. For some considerable time past Mr. D. M. Munro and others have been engaged in treating the tailings of this mine, of which, we understand, there were originally available from 30,000 to 40,000 tons. We do not know how the enterprise has resulted, but the dump will shortly be exhausted. It is probable that steps will be taken later on to re-open the mine and start milling operations again. A favourable report upon the property was made, after it was closed down, by Mr. T. Bruce Marriott, of Messrs. Norton Griffiths, Bruce Marriott & Co., London, and therein it was pointed out that the property had suffered from circumstances unconnected with the value of the ore body.

* * * *

Mica.

The advent of the railway in the low country between Zoekmakaar and Komati Poort has doubtless improved the prospects of the mica industry in those parts. Mr. W. T. Hallimond has recently returned from an inspection of some mica properties where a considerable amount of work has been done at one time or another, and whence the products are being shipped to England, we understand, in fairly large quantities. The venture is controlled from London. Mica deposits have been located quite adjacent to the line of railway by other owners, and operations will probably be begun on one or more of them at an early date. There is no doubt a good and lasting market for the better qualities of sheet mica, and sheets sent from some parts of the pegmatite belt have fetched prices locally which have been as high as those obtained for the best Madras product. Everything depends upon the quantity that can be mined and the cost at which it can be produced and prepared, of course, and from this point of view the conditions in the low country are said to be such as to encourage extensive operations. Prices ranging from 3s. 6d. to 15s. per lb. have been paid in Johannesburg for some of the best prepared mica.

* * * *

Molybdenite, Wolframite and Scheelite.

The demand for molybdenum and tungsten in Great Britain has led to an arrangement by which the Government of Australia has agreed to purchase ores of these metals on behalf of the Imperial Government, and it is understood that a similar arrangement has been made by the Government of the Union. The price fixed by the Imperial Government for the minerals delivered c.i.f. London is as follows:—Molybdenite, 105s. per unit of MoS_2 (Molybdenum sulphide). Wolframite, 55s. per unit of WO_3 (Tungsten trioxide). Scheelite, 55s. per unit of WO_3. The grade has been fixed by the Imperial authorities as follows: Molybdenite, at least 90 per cent. MoS_2. Wolframite or Scheelite, at least 65 per cent. WO_3. Impurities not to exceed ½ per cent. of tin and ½ per cent. of bismuth. Very much higher prices than these can be obtained in the United States and elsewhere, but permits would not be granted for export except through nominated agents, so that it would be practically impossible to ship ores elsewhere than to Great Britain.

* * * *

Base Metal Units.

Some misapprehension appears to prevail with regard to the precise meaning of the term " unit " in connection with the purchase of minerals such as those above referred to. A " unit " is equivalent to 1 per cent. and as quoted in metal price lists means 1 per cent. of a short ton, or 20 lbs. avoirdupois. In the case of scheelite, therefore, the price stipulated is 55s. per 20 lbs. of WO_3, or tungsten trioxide. The chemical composition of scheelite, or calcium tungstate (lime tungstate) is $CaWO_4$, and the percentage of tungsten trioxide, or tungstic acid, which is contained in the mineral is about 80·6, so that it would take about 25 lbs. of scheelite to produce 1 unit, or 20 lbs. of WO_3. In order to carry 65 per cent. of WO_3 a sample, or concentrate, would have to contain, in round numbers, at least 81 per cent. of scheelite. The proportion of the compound in wolframite is 76·3 per cent., so that a 65 per cent. yield would demand a concentration of this mineral up to about 85 per cent. of the bagged product. An 81 per cent. concentrate of scheelite, containing 65 units of WO_3, would then be worth, c.i.f. London, 65 × 55/- = £178 15s. per ton. Ordinarily a lower tenour than 65 per cent. WO_3 finds a ready sale. The price of tungstic acid has materially advanced, of course, on account of the war demand for special qualities of steel; recently, for instance, a sale of a small lot of concentrates, running about 60 per cent., was recorded from New York, the price being 35 dollars per unit WO_3, for spot delivery. A minimum grading of 60 per cent. has usually been the standard adopted, although producers in the States have in some cases followed the practice of hand-picking the ore, and shipping directly all ore carrying 30 per cent. tungstic acid and over. In this way the cost of crushing and concentration and losses were avoided and sufficient profit remained to outweigh the penalty for a low standard. The price of the ore has been fairly high for some years past, and has been steadily advancing. In 1909, for example, customs mills in Colorado were offering as much as 38s. per unit for 60 per cent. ore and 34s. for ore carrying 50 to 60 per cent. tungstic acid. At the working costs prevailing there, or say 16s. a ton for crushing and concentrating, it was profitable to mill ores carrying 2 per cent. of tungstic acid.

* * * *

Gold in Turkey.

That the spirit of the enterprising prospector can never be wholly crushed, even in the midst of the turmoil of war and battles, is abundantly evidenced by the news that some Australians have found time, between shells, to discover a promising auriferous field in the peninsula of Gallipoli. It has since been stated that a party of experienced geologists and mining men are shortly to leave Australia for the Anzac front, and it is not unlikely, therefore, that the memories of early Turkish mines may once again be revived, and ancient workings be re-exploited in the light of modern conditions. History is full of the legends of the old miners in the dawn of history in the lands which are now part of the Turkish Empire. Who has not heard of Pactolus, nor of the " Land of the Golden Fleece "? Nor of the rivers of Eden, of which " The name of the first is Pison: that is it which compasseth the whole land of Havilah, where there is gold," as the writer of Genesis informs us? When, in the third century of the Christian era the power of Rome became centred in Byzantium, the gold mines of Thrace were furnishing large supplies of gold. The old mining fields of Pontus, near Trebizond, and on the western shore of Anatolia about Smyrna, may once again come to renewed vigour under the auspices of the invader.

* * * *

The New Taxation.

One of the most interesting features of the recent discussion in London on the Excess Profits Tax relates to the effect it may have on the gold mining industry. It is pointed out that the tax will fall unequally, and that it seems likely to discourage the production of the indispensable yellow metal. It might even lose Britain her present control of gold mining. It is hoped that the arguments put before Mr. McKenna by the Institution of Mining and Metallurgy may result in some reasonable modification of the original proposals.

* * * *

Zinc-Dust.

Summarising his investigation of zinc-dust precipitation tests, Nathaniel Herz, of Lead, South Dakota, draws the following conclusions: Zinc-dust, satisfactory for precipitation of precious metals from cyanide solutions, should pass the following tests: It should be fine; that is, most of it should pass through a 200-mesh screen, and the fine portion should be very much finer than the screen opening. As the surface exposed per unit weight varies inversely as the diameter of the particles, and the number of grains varies inversely as the cube of the diameter, if the average diameter of one lot of dust is one-half that of another, the finer would have twice the surface and eight times the number of particles. The dust would remain in suspension better, and if uniformly distributed the distance between grains would be half that of the coarser material. The oxide should be low, but very low oxide does not necessarily indicate a good zinc. There should be a reasonable amount of lead, over 1 per cent.; as high as 4 per cent. may do no harm. Cadmium is usually present, and some cadmium may take the place of part of the lead. If oil is present, it should not be in such quantity as to prevent good mixing of the dust with the solution. Precipitation with a standard solution of silver cyanide gives a rapid method for approximating the value of a particular lot of zinc-dust. If the efficiency is well over 40 per cent. (100 per cent. being the theory for complete replacement of pure zinc by silver), the zinc is satisfactory. If under 30 per cent., the dust will probably give poor results. The condition of the metallic impurities may have considerable influence.—*Bulletin* 104 of the A.I.M.E.

Molybdenite Production.

A report on the probable output of molybdenite in New South Wales made by Arthur D. Pedley for the Government, gives the following estimate: "There are several works for the treatment of molybdenite in Sydney, and several of the mines treat their product in the country. As to production, there was a letter in the London "Times" on, I think, April 6th, stating that the production of molybdenite from that date to June 30th next would be 100 tons. Whoever wrote that letter must have known such would not be the case. It would be impossible. When the statistics are available, it will be found that instead of 100 tons the amount will prove about 40 tons—and perhaps a little under. As to the future export—say from July to December inclusive—I think it will prove about 60 tons. Any sensational increase or decrease is not to be expected. More than half the amount quoted will come from old dumps that have been left lying on the surface for years; the other half will come from mines now working. A good many molybdenite mines are now coming to light, but the statements as to their value are inflated. It will require more than present prices to make them pay in most instances. The ore is found in pipes and not in lodes or reefs; in consequence, a mine may last for a year or two or the pipe may come to an end in a week's time without any previous indication, and thus it is a precarious industry."

* * * *

The Appeal from the Trenches.

A report prepared by another party of British munition workers who have been to the Front in France, makes an urgent appeal on behalf of the Forces for more shells, more high-explosive shells, more galvanised iron to make roofs for the trenches, more expanded metal to hold up the sides, and more cable for communications. The men called for more of this, and more of that, but the deputation also saw the need as well as heard it expressed, and they appeal to everyone without exception, to give their best efforts and maintain such a record that the results will sustain all wants at the Front. The report, which is signed by representatives of the Steam Engine Makers' Society, United Brass Founders' Society, the Amalgamated Society of Engineers, the Electrical Trades' Union, and the Boilermakers' Iron and Steel Shipbuilders' Society, says among other things:—"Industrial stoppages, for no matter what motive, cause great indignation. Our troops feel that, while they toil and fight under the full stress of modern military conditions, it is wicked and wrong for anyone to impede their supplies. Every course of action, whether by employers or men, that results in a limited output is regarded with the same detestation." Further: "Nothing more inspiring than the sight of our men at the Front can be imagined, and we return from our tour with a single desire—to do all in our power to maintain and increase the supplies on which the success of their heroic endeavours depends, and without which all they have been giving, and must still give, will have been given in vain."

* * * *

Taxation of Gold Profits.

Mr. A. Stanley Elmore writes to the London papers as follows:—"The business community is apparently most desirous of uniting to support the raising of a great revenue and of loyally and patriotically backing up all reasonable means of accomplishing this vital necessity. But it will certainly express its views and bring its great influence to bear to see that the burden is distributed as fairly as possible, and it is to be hoped and expected that the Chancellor will give due consideration to arguments put forward in no spirit of mere hostility, but with a desire to assist him in his extremely difficult task. As Mr. McKenna stated in the House of Commons last night that 'he proposed to devote the whole of next week to interviewing parties concerned with the Budget proposals.' I would like to suggest for the consideration of the leaders of the gold mining industry that a joint representation should be made to the Chancellor pointing out that any profits now being made in excess of those prevailing before the war do not arise, even in the smallest degree, as a result of the war."

TOPICS OF THE WEEK.

THE "JOHNNIES" ANNUAL MEETING.

The presence of Mr. S. B. Joel in the Chair was the feature of the annual meeting of the Johannesburg Consolidated meeting this week. Mr. Joel's visit to the Rand had encouraged people to expect an optimistic statement—in this, perhaps the over-sanguine were disappointed—and he certainly had much of a cheering nature to impart. The outstanding new fact is the promise of the re-opening in part of the diamond mines; and the news is bound to be welcomed in the diamond centres, where the effect of the war has been felt so much more than on the Rand. Mr. Joel's clear exposition of the globular finances of the company need no further elaboration from us. They are set out in all detail in his speech, of which a full report is printed elsewhere in this issue. A year of war has left the financial position of the company even stronger than before; and encouraged by his review of those satisfying figures, Mr. Joel was able to turn, with a favourable eye, to survey the divers problems of public finance and affairs that touch the many-sided activity of his company. Real estate is, next after mining and pure finance, perhaps the chief interest of the Johannesburg Consolidated. The growth of Johannesburg has, therefore, been a matter of vital importance to the company. The great and growing north-eastern suburbs reflect the steadily increasing interests of the company; and Mr. Joel, after ten years' absence, was able to bear testimony to the surprising extent of the change that the years had wrought. Municipal extravagance is a bye-word here as elsewhere; and Mr. Joel seized the opportunity to emphasise the ever-present need for economy in this direction and the wisdom of striving for an equitable distribution of the burden of municipal capital expenditure between the taxpayer of to-day and posterity. Passing to matters more intimately affecting the great industry upon which the main prosperity of the company depends, Mr. Joel had much of interest and importance to say. Miners' phthisis, he declares, must be more seriously tackled. It must be regarded as a matter of the first importance; and his opinion, expressed with no uncertain voice, is bound to carry weight with, and greatly hearten, all now engaged in the struggle with the evil. The effect of the war on the industry, and the value of the latter to the gold basis of the Imperial credit drew notable references from Mr. Joel. Coming straight from the money centre of the Empire, he is able to bear first-hand testimony to the value of the Rand output to the maintenance of the free gold market of London. And he was able to appreciate and acknowledge the success of the British Navy in keeping open the way for supplies of the necessary stores and materials to reach the Rand.

The excellent position and prospects of the Barnato mines afforded Mr. Joel ground for justifiable optimism. Never has the outlook for the Consolidated Langlaagte, the Van Ryn Deep, Knights, and the State Mines been better. The Consolidated Langlaagte returns he described as "consistently good" since the beginning of the year; and "the position to-day"—owing to the excellent native labour supply—"is a particularly sound one." Development in the Van Ryn Deep has been most satisfactory; and the future, says Mr. Joel, looks "very promising." At the Knights the payable ore reserves have been considerably increased, and Mr. Joel has "every confidence in predicting continued prosperity for this property." For several reasons, the State Mines is, of course, the most important of the mines of the group. In its case Mr. Joel was also able to point to a most gratifying improvement in development; and to the promise of much increased profits when the duplication of the plant "about the middle of next year" is completed. He was also able to make an announcement regarding the probability of the Government agreeing to amend the terms of the lease to admit of the present anomaly in regard to profits division being removed. It will be remembered that this paper was the first to point out the flaw in the lease, which militated against any reduction of working cost, when once a certain figure was attained. Doubtless Mr. Joel's reference was to the removal of that defect, which as it operates at present puts a premium on costly and wasteful management. Mr. Joel added a notable tribute to the improved position of the Far East Rand as a whole. "The public," he said, "has recently taken a very keen interest in what has come to be known as the Far East Rand, and when we look at the excellent results which have been shown by the New Modderfontein, Modder B., Modder Deep, Van Ryn Deep, and Brakpan, combined with the progress being made at Geduld, and the high values being exposed in the Springs Mines and the more recent strike at Daggafontein, there is every reason for optimism. Viewing the position as a whole, too great emphasis cannot be laid on the persistence with which high values have been traced from one mine to another in this district, and I can safely say that never at any period in the history of the Rand has the public had such a number of good sound investments as is presented to it to-day by the bulk of the mines in this area." The success that has attended the leading subsidiaries of the Johannesburg Consolidated fully warranted Mr. Joel in taking to himself some credit for having carried through the fusion of Barnato and "J.C.I." mining interests ten years ago. The mines of the group never stood higher than they do to-day, and the foresight that helped to put them in their present position cannot be too highly commended. "When I last had the pleasure of addressing you in 1905," said Mr. Joel, "and strongly advocated the absorption by your company of the Barnato Consolidated Mines, Ltd., I was subjected to a considerable amount of adverse criticism, I might almost say abuse, as to what was said to be 'shadowy' and 'speculative' business. I have sometimes thought, gentlemen, that perhaps the magnitude of the transaction was not fully realised and appreciated by my critics. Out of the assets we acquired from the Barnato Consolidated Mines, and for which we issued 1,200,000 shares, we have since received by way of profits on realisations and dividends nearly one and three-quarter million pounds, and the assets taken over which we still have remaining on hand include Van Ryn Deeps, Consolidated Langlaagte Mines, Ferreira Deeps, and others which are to-day amongst the principal revenue producing assets of the company. These facts, gentlemen, I think are a sufficient vindication of the policy which at my instigation you adopted."

To Mr. Imroth fell the congenial task of welcoming Mr. Joel back to the Rand. The visit has certainly infused new hope and confidence into industry and commerce, and has had a healthy, tonic effect in a time of doubt and difficulty. Mr. Imroth's thought-compelling remarks on the development of local industries demand a whole article to themselves. To his own efforts much of the credit for the splendid position of the Barnato mines to-day is undoubtedly due; and it was entirely fitting that he should voice the welcome to Mr. Joel in terms of sincere felicitation—a welcome which the whole community will echo and endorse.

Mr. W. H. Pay has been appointed as Acting Chief Inspector of Explosives during the absence on military leave of Major A. B. Denne, Chief Inspector of Explosives.

* * * *

The President of the Institution of Mining Engineers has been asked by the Army Council to nominate a number of suitable mining engineers for commissions in the Tunnelling Companies of the Royal Engineers. The gentlemen appointed will receive temporary commissions, and, after short training, will get an opportunity of service at the front. The most suitable ages will be between 23 and 35, but these age limits will not be strictly adhered to in the case of obviously suitable candidates. Previous military training is not essential.

THE GREATER ROBINSON DEEP AND THE CRITICS.

Despite a certain amount of opposition, the scheme whereby the Robinson Deep, South Deeps and Booysens Estate are to be merged was approved by the shareholders of the Robinson Deep on Thursday. The merits of the fusion have already been discussed in these columns, and it seems clear that if the advice of the technical advisers of the producing company is to be taken at its face value, the terms represent the result of a genuine effort to reach a fair deal. The new Robinson Deep will have a much longer life; the important areas to the south of it will be worked, and thus a valuable block of reef-bearing ground in the Central Rand will be opened up in the speediest and most natural manner, *i.e.*, by union with the producing property above it on the dip. Plainly it is no easy matter to frame an agreement between the proprietors of properties so situated and in such different case, and no scheme that could be framed would be altogether immune from criticism. Undoubtedly the best criterion of the fairness of such a deal is the character and record of its framers. No estimate of mining futures even in the heart of the Central Rand can claim to be infallible, and the best we can expect is an honest and careful effort by those concerned to reconcile the interests of all parties. Mr. Christopherson's speech at the meeting on Thursday indicates that such an honest and careful effort has, in this case, been made. We know that the scheme is not an idea of yesterday. It has been subjected to long and repeated examination by all concerned in its preparation; and its very intricacy—of which some critics complain—is due to the desire to meet the wishes of shareholders who require that their shares should have a speculative as well as an investment value.

The scheme on Thursday did not pass without criticism, and, anxious as we all are to see the interest of Rand company meetings enlivened by the presence of independent and articulate shareholders, the proceedings in that respect were disappointing. Some people, unfortunately, mistake impudence for independence and mere abuse for criticism. That type of critic, of course, prejudices his own case; and when his wordy vehemence takes the form of casting about accusations of "robbery," lies, and "spoliation," the effect is just the opposite of that which it is sought to create. The unfortunate shareholders at the Robinson Deep meeting on Thursday had to sit through wearisome diatribes on the iniquity of amalgamations in general and the sins of the Central Mining people in particular. The whole outburst was, of course, irrelevant, and would never have been tolerated at a meeting conducted under strict rules of debate. Nor can one refrain from remarking on the extraordinary mental attitude of the critic who can find it possible to be affably jocular with the victims of his raillery, when his whole case resolves itself, in the last resort, into an accusation of fraud against the framers of a scheme, and gross incompetence against the technical advisers responsible for it. People who lightly scatter about accusations of dishonesty and bad faith, either can have no sense of the meaning of words, or attach extraordinarily little importance to the crimes which they so cheerfully impute to others. The fact is, this type of critic, from the shareholders' point of view, is infinitely worse than no critic at all. He throws a deal of mud that cannot but stick in part, or, in other words, that causes doubts to arise regarding the honesty of the trustees for the shareholders and the controllers of the industry. If he is right, the directors and engineers of many Rand companies are all rogues, and the shareholders all fools. We believe that not only is this not the case, but that the person making these insinuations is an enemy of the industry and of the place. More criticism let us have by all means—it may be true that there is not enough of it on the Rand. But criticism of which we had so much at the Robinson Deep meeting, that is mere unsupported generalization and sweeping abuse, we shall simply refuse to print, and shall always, though it masquerades as outraged virtue, regard as contrary to the best interests of the industry and of the country.

THE VALUATION OF GOLD MINING SHARES.—II.

The Question of Redemption—Remunerative and Reproductive Interest—The Soundness of the Principle.

BEFORE proceeding to deal with the various formulæ which are used in the preparation of tables of share values, some reference may be made to the principle of redemption, which has been objected to by some on the ground that money advanced for the purchase of shares should be returned in full, together with the addition of a satisfactory rate of interest, if the whole transaction is to be regarded as a profitable and fair business deal. In the calculation of share values, it is generally assumed that a certain portion of the annual dividend paid to the purchaser shall comprise the interest on his investment as stipulated above, and that the remainder, representing a part return of capital shall be invested by him at current, or easily obtainable rates, at compound interest, so that at the end of the dividend-paying period the increments of capital thus re-invested shall, together with the accumulated interest, be equal in amount to the original capital invested. For example, according to share valuation tables, the present value of a dividend of £1 per annum for five years is £4·3294768, assuming a return of 5 per cent. on capital and re-investment at, say, 5 per cent. The interest on this amount for one year is £0·2164738, leaving a balance from the £1 dividend of £0·7835262, which represents a return of part of the original capital invested. This sum invested again at compound interest of 5 per cent. would produce a total amount of £4·3294768. The division of the five annual dividends would thus be as follows:—

	£	£
Yearly interest on principal ...	0·2164738 × 5 =	1·0823690
Annual balance to redemption ...	0·7835262 × 5 =	3·9176310
		5·0000000

It has been stated on the best actuarial authority that the purchaser of an annuity for a term on which he is to be allowed interest at a specified rate, ought, as regards the transaction, to be in the same position pecuniarily at the end of the term, as if he had lent his money during the term at the same rate. The lender receives his interest annually, and has the sum lent returned at the end of the term. The purchaser of an annuity, however, must recoup himself by investing the excess of his annuity over the annual interest on his outlay, as in the calculation shown above, at such a rate that at the end of his term the capital will be reproduced. The borrower, in this case, does not retain the money paid to him until the end of the term, but returns it in instalments, and thus loses the full interest upon its use, which he would otherwise enjoy. During the entire period, however, according to the formula for calculating share values, he continues to pay interest, not merely upon the outstanding balance of the original loan, but upon the whole loan. In the case illustrated above, it may be shown that even if the annual instalments on capital redemption account were not re-invested at all, the lender would have the deficiency automatically made up by the excess interest paid on the capital sums already redeemed. The excess interest, for example, amounts to £0·4118458, which added to £3·9176310, the total amount of the instalments of capital, equals £4·3294768, the original sum lent.

REMUNERATIVE AND REPRODUCTIVE RATES.

It is obvious, of course, that one could not well expect to obtain 5 per cent. as an easily obtained rate for reinvestment, as has been assumed in the calculation given above for the purpose of illustration. The lowest rate at which the instalments of capital can be invested ,are those which are claimed in the purchase of an annuity. There are thus two rates of interest to be considered in the purchase of an annuity, and by analogy in the purchase of a dividend. They are the remunerative rate, which is fixed at a figure sufficiently high to cover the risk that may be considered to be attached to the investment, and the reproductive rate, or that which may be regarded as practicable for the re-employment of the capital redemption fund. Suppose, for example, that an annuity of £1 for five years were purchased to return 6 per cent. on the purchase price, and allowing a rate of 3 per cent. for reproductive purposes. The present value of the annuity, according to the tables, would be £4·0270. The yearly interest due on this sum, at 6 per cent., would be £0·2416, leaving a balance of £0·7854 towards the redemption of the principal. At the end of five years the total interest paid at 6 per cent. per annum would be £1·2080, or £0·4833 in excess of what ought to have been paid if allowance had been made for the annual repayments of the purchase price. Similarly, the instalments over and above the yearly remunerative interest would amount to £0·7854 × 5 = £3·7920. In order to reproduce the purchase price of £4·0270, an amount of interest equal to £0·2350 would have to be obtained during the re-investment period, and it will be seen that in any event the excess interest of £0·4833 above referred to is more than enough to meet the case, supposing that the sums on account of redemption were not re-invested at 3 per cent. as stipulated by the formulæ. As in the first example, the continuous payment of interest on the whole original sum renders the transaction a sound one apart from the additional consideration.

New Kleinfontein.

The report of the directors for the quarter ended 30th September, 1915, shows total working costs £139,245 9s. 9d., or 17s. 0·835d. per ton milled; net working profit, £69,589 5s. 10d., or 8s. 6.369d. per ton milled; revenue, £208,834 15s. 7d., or £1 5s. 7·204d. per ton milled. No allowance has been made in the above statement for: Apex-Benoni section: Pumping, maintenance, etc., £3,375 19s. 10d.; interest, £2,646 11s. 1d.; Government profits tax, £5,400; special war tax, £2,700. Mine.—Shaft sinking: No. of feet sunk: New Kleinfontein section, 185 ft.; Apex section, 33 ft. Development: No. of feet, driven, risen and sunk (excluding shafts)—New Kleinfontein section, 4,849 ft.; Apex section, 1,220 ft.; footage sampled, New Kleinfontein section, 2,670 ft.; average mining width, New Kleinfontein section, 55 ins.; average assay value (mining basis), New Kleinfontein section, 5.40 dwts.; estimated tonnage of ore exposed by drives, etc. (mining basis), New Kleinfontein section, 141,595 tons. As the reef is not fully exposed by the drives in the Apex section, values will not be available until box holes are put in. Ore treatment: Tonnage mined, including ore obtained from development faces, 195,705; less sorted out (16.53 per cent.), 32,348; tons to mill, 163,357; deduct added to ore in bins, 207 tons; ore milled, 163,150 tons. Capital expenditure: Apex-Benoni section, £19,318 19s. 11d. New Kleinfontein section: Shaft sinking, £2,832 7s. 11d. Ore reserves: The ore reserves at the end of the quarter on a mining basis were as follows: Payable: 2,849,732 tons; mining width, 57.36 ins.; value, 5.51 dwts. Unpayable: 1,269,987 tons; mining width, 51.90 ins.; value, 2.76 dwts.

Luipaardsvlei Estate.

During last month, October, this Company crushed 22,140 tons, the profit won being £5,105.

The Sheba.

The following are the results of operations at the Sheba Mine for the month of October:—Crushed, 6,988 tons, yielding 2,603 ozs. fine gold; estimated profit, £2,013.

THE POSITION OF GLYNN'S LYDENBURG.

Points from the Manager's Report.

In the course of his report for the year ended July 31, the manager of the Glynn's Lydenburg writes:—Ore developed during the year, 60,032 tons; add balance remaining from last year, 4,968 tons; tons developed at 31st July, 1915, 65,000 tons, value 8·4 dwts. over 11·8 inches. Of the above, 36,070 tons value 9·4 over 11 inches are in Mill Hill Section and 28,930 tons value 7·3 dwts. over 13 inches in the Werf Mynpacht. An allowance has been made for waste unavoidably added during stoping operations, so that the above figures represent as nearly as possible milling values. In the light of past experience this allowance has been made on somewhat more liberal lines than in previous years. The total cost of mining amounted to £28,777 18s. 11d., made up as follows: Mining, £21,643 4s. 11d., or 9s. 3·4d. per ton mined; development, £7,134 14s., or 3s. 0·7d. per ton mined; total, £28,777 18s. 11d., or 12s. 4·1d. per ton mined. The cost of tramming for the year was £1,888, or 9·7d. per ton mined. Current ore treatment: Mill: Number of stamps in operation, 20; running time, 342·312 days; tube mill working, 1; tube mill ran 340·233 days; ore received from mine, 46,642 tons; plus difference in bin as at 31st July, 1914, and 31st July, 1915, 1,167 tons—47,809 tons; crushing duty per stamp per day, 6·983 tons; value of ore per ton before crushing as determined by mill yield plus assay value of pulp leaving mill, 8·78 dwts.; yield, 6,774·725 fine oz.; yield per ton, 2.834 dwts.; assay value of pulp leaving mill, 5·95 dwts. Cyanide works: The following are statistics of cyanide treatment:—Tonnage treated, 47,809 tons; percentage of mill pulp, 100 per cent.; assay value of originals, 5·95 dwts.; assay value of residues, ·491 dwts.; yield, 13,165·696 fine ozs.; yield per ton treated, 5·507 dwts.; theoretical extraction, 91·731 per cent.; actual extraction, 92·565 per cent. Summary of ore treatment (on basis of tonnage milled):—Mill: Total yield, 6,774·725 fine ozs.; fine dwts. per ton, 2·834; percentage of total yield, 33·975. Cyanide works: Total yield, 13,165·696 fine ozs.; fine dwts. per ton, 5·507; percentage of total yield, 66·025. Total yield, 19,940·421 fine ozs.; fine dwts. per ton, 8·341; percentage of total yield, 100·00. The total cost of reduction operations amounted to £9,416 0s. 1d., made up as follows:—Milling: Total cost, £3,671 12s. 8d., or 1s. 6·4d. per ton milled. Cyaniding: Total cost, £5,744 7s. 5d., or 2s. 4·8d. per ton milled. Total cost, £9,416 0s. 1d., or 3s. 11·2d. per ton milled. Revenue and expenditure—working account:—The revenue was as follows: Value of yield from mill, £28,291 6s. 5d., or 11s. 10d. per ton milled; value of yield from cyanide, £54,980 3s., or 23s. per ton milled. Total, £83,271 9s. 5d., or 34s. 10d. per ton milled. The expenditure was as follows:—Mining expenses: Mining, £21,643 4s. 11d., or 9s. 0·7d. per ton milled; development, £7,134 14s., or 2s. 11·8d. per ton milled. Reduction expenses, £9,416 0s. 1d., or 3/11·2 per ton milled. Tramming, £1,888, or 9·5d. per ton milled. General expenses: Mine, £6,493 8s. 5d., or 2s. 8·6d. per ton milled; head office, £5,972 19s. 10d., or 2s. 6d. per ton milled. Total working costs, £52,548 7s. 3d., or 21s. 11·8d. per ton milled. This shows an increase in the working costs of 2·9d. per ton as compared with the preceding year. To sum up, the working expenditure and revenue account stood thus:—Total revenue, £83,271 9s. 5d., or 34s. 10d. per ton milled; total working costs, £52,548 7s. 3d., or 21s. 11·8d. per ton milled; working profit, £30,723 2s. 2d., or 12s. 10·2d. per ton milled; sundry revenue, etc., £4,182 9s. 10d., or 1s. 9d. per ton milled; total profit, £34,905 12s., or 14s. 7·2d. per ton milled. Werf Mynpacht: Work in this section of the mine was much interfered with by the heavy rains experienced during January and February last. Development work was practically stopped and was not fully resumed until the end of July. In February, on account of the increase of water in the mine, a new pumping station was decided upon. A sump was made in cyanide drive, through which water could be pumped at a very low head. A 6-inch pump was installed capable of dealing with 720,000 gallons per day. This started work during March and has since worked at practically its full capacity. Arrangements for a duplicate set have been made, which should be capable of dealing successfully with any water which may be encountered for some time to come. In addition to these pumps, it is necessary to have other pumps in development drives. Notwithstanding all the difficulties encountered, a fair quantity of ore was developed in this section during the year. 5,154 feet of development were driven, and 22,506 tons of ore were developed. The prospects in this section are quite hopeful. Mill Hill: During the year under review 77·26 per cent. of the ore mined was obtained from this section, and it is still yielding a large proportion. 34,096 tons were developed during the year. In January considerable damage was done to this section of the mine by the heavy rains, falls of ground occurring everywhere. Had there not been a considerable reserve of ore in the bins, the output would have suffered to a much greater extent than it did. South Hill: During the past year 2,685 tons were mined from this section. As has been customary in making calculations of ore reserves, no tonnage has been taken into account for this section, but it will continue to yield a small quantity of ore for some time to come yet. Work on the lower or western portion of this Hill was continued, but, although a considerable amount of driving was done, no success was met with. This work was stopped in January last by the floods, and has not yet been resumed. Compound Hill: A considerable amount of work has been done in this section, with disappointing results. Work is still being continued. A tramline of 2,234 feet in length was put down in order to connect it with the main tramline leading to the mill. Prospecting Claims: The block of 150 prospecting claims adjoining the southern boundary of the Werf Mynpacht is still held by the Company. The drives in the Werf Mynpacht are proceeding towards them. The plant is in good order and has been running well. The tube mill was re-lined in March after running nearly two years. The electric power plant has been kept in good order, though it was damaged on several occasions by lightning. The new generating set for this plant has been delayed by the war, and is now long overdue. Work on the new weir in connection with the electric power station was unfortunately much delayed in starting, and was subsequently interrupted by the floods. It is not yet completed. The plantations are looking well now. During the year only a limited number of trees were cut down. Every effort has been made to improve the plantations, and it is anticipated that during the coming year a larger amount of timber from this source will be utilised for mine purposes. The rainfall for the year was 64.50 inches on 139 days, as compared with 41·47 inches on 136 days for the previous year. The abnormal rains of January and February last caused enormous damage in the district. They were far worse than any previously experienced. The railway was hung up for a long time, and no trains reached Sabie for several weeks. In consequence of the rains, the water supply is now better than it has been for some time. The native labour supply for the year has been good, and no difficulty has been experienced in getting sufficient natives for our requirements.

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SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - 60% ,,
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THE FLOTATION CONCENTRATION OF ORES.

Detailed Information, Collected From Many Sources, on the Subject.

[In view of the widespread interest in the subject of Flotation, the latest volume of "The Mineral Industry," from which this article is taken, contains as detailed information on the subject as could be obtained. On account of pending litigation, not as much information is available as might be desired. The following material is the result of a series of letters to the various companies concerned, and outlines the situation as it stands at present so far as could be learned. Until decisions are handed down in the cases at present undecided, the various operating companies cannot be classified beyond the two general divisions, those operating under Minerals Separation license, and thise operating without a license.]

The success which has attended the use of flotation on diverse ores in different parts of the world, has aroused wide interest in the flotation processes and their application. Flotation is a general method of separating sulphide minerals from gangue. It has been for the purpose of making this separation that most flotation apparatus has been developed and most installations made. The forces which give rise to flotation are believed to be molecular forces, and their peculiar activities are evidenced as follows: First: Minerals of non-metallic aspect and most non-sulphides are more easily wetted by water than are sulphide minerals and some few other minerals of metallic aspect, as graphite. Second: The difference in tendency to become wetted by water can be accentuated by the use of certain substances, of which the oils form a large group. Third: When this difference in tendency to become wetted by water has been accentuated by the proper use of such substances in minute proportions, small particles of sulphide minerals have a strong tendency to be held at gas-water surfaces. This tendency is usually so strong that persistent and stable froths can be formed in large quantities composed almost entirely of sulphide minerals with water forming the bubble walls. These phenomena are generally considered as resulting from "surface tension" forces. By surface tension forces are meant the molecular forces acting at air-water surfaces which give rise to a number of phenomena, among them the meniscus phenomena and the skin or membrane effect at an air-water surface. In view of the erroneously exaggerated importance given to some of the prior art patents, notably that of Carrie J. Everson, it is perhaps well to correct such statements at this time, as their true status has been carefully investigated and made known in sworn statements in the various cases now in the Federal Courts. It has been known for centuries that oils tend to coat metallic particles immersed in water. This was disclosed about 400 B.C. in the writings of Herodotus. The next appearance of this fact in public documents or literature was in a British patent to Haynes in 1860, wherein was disclosed a process for concentrating ores by producing a mortar-like mass of finely ground ore and about 11 per cent. of oily material. From this mass the gangue was washed out by the action of the triturating machine or pug mill. Nothing of any practical value came from this disclosure. Twenty-five years later an American women, Carrie J. Everson, disclosed an improvement upon this process consisting in the use of acid in connection with the oil, but this process also proved to be of no commercial value. It represented, however, a substantial step forward over anything that had gone before, as it disclosed a new phenomenon, namely, the accentuation by sulphuric acid of the differential tendencies of sulphides and gangue to become wetted by oil and water. The patent was applied for in 1885 and issued in 1886. It describes two methods, in one of which the process is essentially the same as Haynes, except for the addition of acid, and here the amount of oil is 5 per cent. of the ore. The second method disclosed in the Everson patent employs a light oil, such as kerosene, and recommends the use of such a proportion of oil, 17·1 per cent. of the ore, or 342 lb. to the short ton of ore, that the mixture of metalliferous mineral and oil is lighter than the sand or gangue, but heavier than water. The patentee says "that the devices and methods known in the wet separation of ores may be used for separating the metalliferous mineral and gangue, bearing in mind that the sand and metalliferous mineral are merely transposed or their relative positions are reversed." This process has been represented to be a flotation process, but it falls far short of that, since the mixture of oil and metalliferous mineral, being heavier than water, could never reach the surface. It is, however, perfectly feasible to carry off the metalliferous mineral in suspension in exactly the same manner as the sands are carried off in the wet treatment of ores. This process was especially recommended for previous metals, and is reported to have been tried out on one occasion with a silver ore from Fryor Hill, Colorado, and on another occasion with a gold ore from the Eureka and Excelsior mine in Oregon. Probably in both instances enough oil was used to float the sulphides by oil buoyancy. The publications describing these tests are so indefinite in their disclosures that no exact information is obtainable from them. Flotation of minerals by oil buoyancy was definitely and certainly accomplished by the Elmore processes which appeared about 1900. The use of acid, which had been disclosed by Miss Everson, was availed of. The quantities of oil used were about 100 per cent. of the ore, and on an average there were three successive treatments, each with an amount of oil equal to 100 per cent. of the ore, the oil being recovered, so far as possible, by the use of a centrifugal separator. These Elmore processes were tried out extensively in various parts of the world, but the cost of oil was always found to be prohibitive and the operations were abandoned as uncommercial. They created considerable interest in the metallurgical world, however, and stimulated other inventors to attempt improvements, but none of the improvements became commercial. Variously, these proposed improvements involved blowing air into the mass of oil to make it spongy and add to its buoyancy, or of generating gas chemically therein so as to introduce bubbles of gas into the mass of oil and mineral and thereby exercise its buoyancy, or else of using a thin oil which could be wholly recovered by distillation, so as to diminish the consumption of oil and provide for its complete recovery, together with the blowing in of air. The oil proportions in these proposed modifications were from 12·5 per cent. upward, mainly upward. A further reduction of the oil to about 2 or 3 per cent. on the ore was found to result in a gathering of the mineral particles into pellets when properly agitated, and these pellets could be agglomerated until they were of such size that the gangue mineral could be washed free of them by an up-current of water, the pellets sinking and forming a clean concentrate. These pellets were similar in structure to concrete, the oil taking the place of cement. the sulphide particles taking the place of the sand in the rock, though, of course, on a diminutive scale. The oil consumption in this process, which was known as the Cattermole process, was still prohibitive for most ores, and while an attempt was made to operate it commercially, the discovery of the agitation air-froth process at about that time changed the whole course of oil concentration. It was found while investigating the economic limits of the Cattermole process, but in fact carrying the reduction of oil far below the Cattermole limits, that if the oil used was reduced to a small fraction of 1 per cent. of the weight of ore, and other proper conditions were maintained, a most striking change took place. Instead of the pellets being formed, the mineral came to the surface as a heavy froth, the bubble walls being armoured with sulphide mineral, the gangue being left behind, or sinking, and the oil used practically disappearing. This froth was tenacious and stable and has stood for weeks without altering. The characteristic of this process, wihch is the agitation of air-froth process and which has successfully solved the problem of concentrating metalliferous minerals with all their slimes, is the utilization of bubbles of air for the selection of the metalliferous mineral. The frothing agent, usually, though not necessarily, oil or containing oil, when present in minute proportions, controls the air-bubble formation, and increases the attraction of the air bubbles for the sulphide particles. It gives to the mineral froth which is formed a persistency such that the bubbles will carry the mineral up through the pulp and through the surface of the pulp to form either a mass of quiet froth which will gently overflow the lip of a spitzkasten, or an active ebullient froth such as will carry the mineral over the lip of the apparatus in which the froth is formed. The first method of separation is by spitzkasten with agitation in a separate vessel. The second method of separation is that by sub-aeration, with air admission at the lower part of a body of liquid and frothy delivery above the upper surface of the same body of liquid. Some time before this discovery was made, it had been found that certain zinc sulphide ores, such as those at Broken Hill, Australia, when treated with hot dilute sulphuric acid solutions, would yield a froth of sulphide mineral. The explanation of this was believed to be that the hot sulphuric acid solution thoroughly cleaned the surfaces of the mineral particles, thus making the surface forces more active and also generating a small amount of hydrogen sulphide at those surfaces which immediately became attached to the particles. The sulphuric acid also generated carbon dioxide from carbonates in the ore, and the various gases floated the mineral to the surface where it could be separated. The froth thus formed, while similar in appearance to the agitation air-froth, was much more tender, and it easily dropped out the coarser mineral. This process, called the Potter process, formed the basis of important installations in Australia, the largest being that at the Broken Hill Proprietary mine. It is much more efficient, however, if some oil is used with it. Another process brought out somewhat later was the Elmore Vacuum process, in which gas for floating the sulphides was generated chemically, and the separation was effected under vacuum. This has also had an important application, but on account of its lack of power to treat large quantities of slime, its use has not been extensive. Another and later process which depends on the same surface tension forces, is the De Bavay process. In this the prepared ore is brought carefully to air-water surfaces and the mineral floats on the water surface and is thereby removed, while the gangue sinks. This is carried out in cold circuit and large tonnages have been and are now being treated in the Broken Hill district by this method. The so-called Macquisten Tube process is another surface tension flotation process, which has had a limited success. Both of these use oil and acid. In the agitation air-froth, or Minerals Separation process which has been installed all over the world, slimed sulphide mineral not separable by gravity concentration, offers little or no difficulty; in fact its presence is advantageous. In the application of this process, fine grinding is the rule. for with the danger removed of high losses in slimed mineral, it becomes merely an economic question as to how fine it pays to grind an ore in order to get all the mineral released. This, of course, varies with each ore, and now that the problem is being studied from this angle, it is being found that many ores require very fine grinding to free the last few per cent. of mineral from the gangue. Sometimes particles of ore so small that they can only be clearly distinguished as separate particles under a high-power microscope, will be seen to still have attached to them smaller particles of mineral. In such cases, therefore, the problem becomes a matter of balancing costs against recovery and grade of concentrate; that is. it becomes economic instead of metallurgic. From the standpoint of the flotation operator, there are two general classes of ores; first, ores that can be worked at normal temperatures, and, second, ores that require hot circuit treatment. In the first class come practically all of the common copper, silver, lead, and pyritous gold ores, while in the second class come the zinc ores. In working copper ore, it is not so essential to make an exceedingly clean concentrate, that is, a concentrate practically free from gangue, as it is to make a high recovery. In working zinc ore a clean high-grade concentrate is essential. This is due to the different requirements of the smelters of the two metals and to the difference in price of the two metals. The copper smelter can handle at a profit an ore or concentrate sometimes of very low grade, and can successfully handle a large tonnage of diverse ore with a relatively cheap plant and with low tonnage costs. The zinc smelter, on the other hand, is tied to the necessity of making a large capital investment to get a relatively small tonnage capacity, and his tonnage costs are high. It is necessary for him to get an ore or concentrate having a large amount of metal in it, in order to keep his pound costs low. On account of the low price of zinc compared with copper, and the necessity of locating zinc smelters where labour and fuel conditions are favourable, the freight charges against zinc ore and concentrate amount to a large percentage of the returns. This is a general statement applicable to normal conditions, not to abnormal world-war conditions. The effect of this on the flotation operator is that, with a copper ore, he can make an excellent profit from a concentrate that would be of too low a metal content on the basis of zinc smelter schedules, to pay transportation to the smelter. In fact, it could not be accepted at all. On the other hand, the operator of a zinc property has to ship a zinc concentrate running as high in zinc as possible, which means that he has to eliminate all the gangue possible from his ore or concentrate. While he is, of course, influenced largely by the freight rates against his concentrate, his conditions are nevertheless dominated by the smelter requirements and spelter price, and he must work accordingly. Clean concentrates with good recovery are usually obtained by using a circuit heated to approximately 120 deg. F. (50 deg. C.), and made acid with sulphuric acid. The most notable examples of installations using this method are at Broken Hill, Australia, and Butte, Montana. Hot acid treatment was for some time considered the most general method of flotation, and it was believed by operators and experimentalists that an ore which would not yield a froth under these conditions would not float at all. The work on copper ores in America has demonstrated, however, that many ores can be worked most successfully in cold circuit, and that certain minerals of great economic importance, as chalcocite, will work splendidly in cold neutral or alkaline circuit where they will work with great difficulty, if at all, in a hot acid circuit. In the flotation treatment of zinc ores the kind of oil used, while important, is not so critically important as it is in the treatment of copper ores in neutral or alkaline circuit at normal temperatures. In the latter case the choice of oil or oil mixture may make the difference between success and failure, and no flotation results at all may be made with some oils or an ore that will yield excellent results with other oils. Also, an oil may work successfully in one case and not in another. Many copper ores, however, are easily treated with a number of different oils. In general, the flotation operator on copper ores uses mixtures of coal tar and its derivatives, various wood oils, as turpentine, pine oil, and the wood creosote oils, and a number of the heavier petroleum distillates, and fuel oil. The asphaltum base oils appear to be more useful than the paraffin base oils. Some copper ores work best in an acid circuit, and in some cases even a hot acid circuit is necessary to get a good result. Some will not work at all except in a neutral circuit, and some require an alkaline circuit for best results. This is a matter of determination for each ore, and no general rule can at present be laid down as applicable to all ores. While zinc sulphide is amenable to the agitation air-froth process in cold non-acid circuit, and in some cases a commercial concentrate can be made with a fair recovery, still, in general, it requires hot acid treatment for best commercial results. Recently a great deal of thought and work have been given to the development of so-called selective flotation, wherein the difference in flotability of different sulphides is taken advantage of to make separations between them. These differences are accentuated by introducing conditions under which one sulphide is more easily floated than another, and then when the first sulphide is recovered, establishing proper conditions to float the second sulphide. This is becoming of increasing economic importance at Broken Hill in the separation of lead from slime tailing and the subsequent making of a slime zinc concentrate. In America the possibility of making large profits by increasing the recoveries and raising the grade of concentrates at the porphyry copper properties and thereby lowering their pound costs of producing copper, has been of over-shadowing importance to flotation men, and most of the work that has been done has been on copper ores. At the same time large tonnages of zinc ore are now being treated in Butte and elsewhere by flotation, and such treatment for these ores is firmly established. It is probable that about 1,000,000 tons of ore was treated in North America during 1914 by the various modifications of the agitation air-froth process. The tonnage to be treated during 1915 will probably be greatly in excess of that.

THE DUMB-BELL TUBE MILL.

[By G. A. Robertson.]

At the Mining Exhibition held under the auspices of the Chemical, Metallurgical and Mining Society in May, 1914, there was exhibited under the names of G. A. and D. Robertson a new type of tube mill. The main features of the mill were that instead of using pebbles as the grinding medium a roller of dumb-bell shape was substituted. The weight of the roller was 2,260 lbs. and this weight was concentrated to the two ends of the roller, each end having a face 6 in. wide. These faces are concave shape, the radius being 18 inches, and these faces fit into the two convex faces in the shell of the mill. The mill is 3 ft. 6 in. long and 2 ft. 9 in. diameter. The roller is 1 ft. 8 in. diameter. The motion imparted to the shell of the mill by means of a belt also makes the roller revolve. In practice the speed of the mill to the speed of the roller is about 40 to 60 revolutions per minute. Both ends of the mill are the same. An iron ring bolted to a flange on the inside of one of the trunnions forms the feed end of the mill. By changing the ring to the other end of the mill, the outlet end then becomes the inlet. The mill can also be fed at both ends and the pulp discharged from both ends. The inlet feed pipe or chute is more elevated than the inlet usually feeding tube mills. In the case of the dumb-bell tube mill the feed does not touch the trunnion but is fed directly under the roller. The dumb-bell tube mill is equipped with centrifugal classifiers fitted into the trunnions on each end of the mill. These classifiers revolve with the mill, and all particles of sand which drop into the pockets of the centrifugal classifier are elevated by the classifier and returned to the mill for further crushing. The mill as described was entered for the Exhibition before it was built. It was, however, the result of previous experience. The mill is erected on roller bearings bolted to a frame made of 6 in. by 8 in. timbers. The frame is then wedged into position on an earthen plane. Through the permission of Mr. K. W. Sartorius, the manager of the May Consolidated Gold Mining Company, Germiston, this mill was erected on the company's property, and a few tests were made before the mill was removed to the exhibition held in the Drill Hall, Johannesburg. A stream of pulp from five stamps was bye-passed for experimental purposes, and the following results were obtained by feeding the mill in the same manner as a tube mill. A device was used at the bottom of the battery plate for classifying or sorting out a coarse portion of the pulp passing an 800-mesh screen. Turbid water was then added to the classified pulp, which then flowed directly into the dumb-bell tube mill, without any attempt at dewatering the pulp. Mr. H. Stadler was responsible for the samples and grading tests, and Mr. A. F. Crosse for the assays.

800 MESH (0·0249 in.)

I. TEST.

Mesh.	Intake.	Discharge.
+ 30	3·5%	– %
+ 60	29·5%	0·5%
+ 90	19·2%	22·9%
+200	12·5%	22·8%
– 200	35·5%	53·8%
	100 %	100 %

Moisture, 92·3%

Duty per 24 hours, 5·2 ton.

II. TEST

Mesh.	Intake.	Discharge.
+ 30	7·3%	– %
+ 60	33·3%	12·3%
+ 90	16·8%	28·4%
+200	10·9%	14·7%
– 200	31·7%	44·6%
	100 %	100 %

Moisture, 90·4%

Duty per 24 hours, 6·5 ton.

500 MESH (·03385).

III. TEST.

Mesh.	Intake.	Discharge.
+ 30	20·2%	– %
+ 60	30·0%	9·1%
+ 90	14·6%	27·3%
+200	8·3%	16·6%
– 200	26·9%	47·0%
	100 %	100 %

Moisture, 94·2%

Duty per 24 hours, 4·4 ton.

Assay Value } +30 +60 Grade.

First and Second Test.

Intake.	Discharge.
2·8 dwt.	0·6 dwt.

After the mill was exhibited at the exhibition, where it was driven by a 3 h.p. motor and a 3 in. Duxbak leather belt supplied by the makers, the mill was again transplanted to the May Consolidated Mine and sunk two feet deeper into mother earth than previously. The fall then available from the stamp mill plate launder to the trunnion of the dumb-bell tube mill was 3 ft. The mill was then fed at both ends and discharging from both ends, and the following results were obtained:—

MILL FEEDING AT BOTH ENDS AND DISCHARGING FROM BOTH ENDS.

FEED FROM 5 STAMPS (ABOUT 25 TONS) PASSING 600 MESH (APERTURE ·030).

Screen.	Grading. Inlet.	Grading. Outlet.	Moisture in feed sample.	Assays.		Duty per 24 hours.	Remarks.
(1) + 60	31·4	11·1	75%	+60	+60	16·5	Average assay of slime charges for this date, 1·1 dwts.
+ 90	16·5	24·1		Inlet.	Outlet.	tons.	
– 90	52·1	64·8		2·6	1·3		
				dwts.	dwts.		
(2) + 60	24·7	15·6	Full				No. 1 sample is this sample concentrated. Grading given here is on the full feed of 25 tons.
+ 90	16·7	22·0	battery			25	
– 90	58·6	62·4	water.			tons.	
(3) + 60	42·1	30·2					
+ 90	21·5	27·0	60%	2·6	1·2	13·5	
– 90	36·4	42·8		dwts.	dwts.	tons.	This test made to ascertain the amount of slime produced.
(4) + 60	42·8	16·9					
+ 90	18·7	33·4	75%	3·7	1·6	14·5	
+ 200	12·2	16·7					
200	26·3	33·0					

The experience gained here was that a low percentage of moisture, even 60 per cent., was not conducive to good crushing. Sand seems to accumulate in the mill to the detriment of crushing. Tests were then made to ascertain how coarse a feed the dumb-bell tube mill was capable of crushing. A portion of the battery screen was then equipped with a ¼ in. mesh and this flowed direct to the dewatering box. Subsequently a ½ in. mesh was used, and the following results were obtained:—

Single feed and discharge, mesh half-inch.

	*Inlet.	Outlet.	
+30	46	Nil.	Duty per
+60	19	Nil.	24 hours,
+90	11	12	3 tons.
–90	24	88	

It was then decided to put a full ½ in. screen in the stamp mill. The pulp issuing from this screen flowed over a 600-mesh screen, aperture ·030. The pulp passing through this screen flowed over the battery plate. The coarse sand which flowed over the 600-mesh screen dropped into a separate launder and was then conveyed by clean water to the dewatering box of the dumb-bell tube mill, and the following results were obtained:—

	Inlet.	Average assay.	Outlet.	Average assay.
+30	67·5	2·75	15·5	1·6
+60	18·5		40·5	
+90	5		15·5	
–90	9·0		28·5	

Size D feed. Mesh ½in. Duty 7 tons per 24 hours.

Except where stated, Mr. Butler, the mine assayer, was responsible for the gradings and assays, a few of which are given.

By cutting this coarse feed down to between four and five tons per 24 hours, a very fine product can be obtained from the dumb-bell tube mill. As this mill is steam driven off a line shaft, the power consumed in driving the mill cannot be measured. However, it is estimated that the power required to drive the mill 40 r.p.m. is about 4 h.p. The capital expenditure of this type of mill is small and the wearing faces are limited to the two concave and two convex faces already described. For the time the mill was run these faces show very little wear. The centrifugal classifier works admirably well, and the mill itself is also a classifier. The water line inside the mill is practically a horizontal plane clearly defined. The deepest points inside the mill to which heavy particles of sand gravitate, is the centre of the two convex faces or channels of the shell of the mill. No separate convex wearing liners were fixed in the mill. Extra iron is provided in the shell casting which is in two halves, the joint being the centre of the faces. The roller faces fit into this channel so close that a slight ridge all round the centre of the roller faces is formed, due to the joint in what might well be called the "travelling dies." In this mill there are two actions, impact and compression. Assuming we get the same actions in a tube mill, would, however, 2,260 lbs. of pebbles do the work of this dumb-bell roller. The writer says no. No proof has ever been advanced to show that as the pebble load in a tube mill increases the tube mill is capable of crushing a coarser product. I am, however, prepared to argue, and also prove, that as the dumb-bell roller increases in weight the diameter of ore particles fed to the mill can also be increased. Though the weight of the roller in use is only 2,260 lbs., I may mention, however, that the mill was designed for a two-ton roller, but was limited to the weight stated for the exhibition floor. The thanks of the writer are due to Mr. K. H. Sartorius, the manager of the mine, for permission to carry out these experiments, the mine also having borne all erecting expenses. The experiments are still in progress.

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*As there is no secondary crushing plant on the May Consolidated, only a limited number of screens are in use.

The seventh annual general meeting of the South African and General Investment and Trust Company, Limited, was held in London in mail week. Mr. R. Littlejohn presided, and moved the adoption of the report for the year to June 30 last. Investments at £56,000, he explained, showed a reduction of fully £8,000. The past year had not been a favourable time for realising investments and putting out the money on mortgage at better rates of interest. Freehold and leasehold properties at £57,000 odd were less by fully £6,000. The company had disposed of all the old properties they had had on their hands. Their main property in Johannesburg, the Trust Buildings, was in good order and well let. The same could be said of their Natal Trust Buildings in Durban. That property was a particularly satisfactory and appreciating asset. Cash, £28,000 odd, was ample for current purposes. The profit and loss account could be regarded as satisfactory. The profits, at £26,500 odd, were down only about £1,500. On the other side, the expenses, apart from income-tax, were less by £400, and the balance carried to the balance sheet was £17.246, as compared with £20,032. The Company's business in South Africa was sound and satisfactory, not only in Johannesburg, where their business of agents, executors, trustees, etc., was a very considerable and steadily increasing one, but also as regarded their new departure of extending operations to parts of South Africa other than the Transvaal. Mr. Clement Davies seconded the resolution, which was carried unanimously. The final dividend of 1½ per cent., making 3 per cent. for the year, was formally declared.

Transvaal G.M. Estates.

The following are the particulars of this company's output for the month of October, 1915:—Central Mines: Tons crushed, 11,850, yielding 5,874·880 fine ozs. Elandsdrift Mine: Tons crushed, 575, yielding 622·495 fine ozs. Vaalhoek Mine: Tons crushed, 1,390, yielding 404·941 fine ozs. Estimated value of month's output, £28,640; estimated profit for the month, £11,894. The reduced profit is mainly due to lower grade recovered at Central works.

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WRIGHT'S ROPES.

TRANSVAAL MAKES RECORD GOLD OUTPUT FOR OCTOBER.

May, 1913, Record Beaten by £14,125—Growing Labour Force.

During the past month the Transvaal mines produced 797,631 ozs. of fine gold valued at £3,388,122, which constitutes a record, being the largest amount of gold produced in a month. The previous record was 794,306 ozs., value £3,373,998, declared for the month of May, 1913, which has now been exceeded by £14,124. For March, 1912, an output of £3,528,688 was announced, but this total included gold to the value of £297,946 taken from reserve, the value of the gold actually produced in that month being £3,230,742. The October output is no less than £80,147 better than that for August, 1915. But for the fall of rock caused by earth tremors in the Village Main Reef mine the record of May, 1913, would have been exceeded by something like £50,000. In October 210,017 natives were employed in the Transvaal gold mines, as against 204,833 in September, an increase of 5,184 for the month, and an increase of nearly 20,000 since the end of June. The official output figures for October as compared with those for September are as follows:—

Witwatersrand.

	Ozs.	Value.
October	769,798	£3,269,893
September ...	749,235	3,182,548
Increase ...	20,563	87,345

Outside.

October	27,833	118,229
September ...	27,515	116,875
Increase ...	318	1,354

Grand Total.

October	797,631	3,388,122
September ...	776,750	3,299,423
Increase ...	20,881	88,699

The Witwatersrand total for October shows an increase of £87,343 compared with the previous month, but the daily average yield is slightly less than that for September owing to the decrease of £34,474 in the Village Main Reef return.

The Stamp Position.

In October 10,062 stamps were dropping on the Transvaal goldfields, as against 10,048 in September, an increase of 14. The official figures are as follows:—

	Rand	Outside.	Total.
October	9,530	532	10,062
September ...	9,515	533	10,048
Increase ...	15	—	14
Decrease ...	—	1	—

Native Labour.

For the last three months the figures are as follows:—

	August.	September.	October.
Gold mines	196,863	204,833	210,017
Coal mines	9,943	9,743	9,513
Total	206,609	214,576	219,530

Individual Returns.

The following are the returns of the Witwatersrand mines:—

	Ounces.	Value. £	Inc.	Dec.
Aurora West	4,007	17,021	—	1,015
Bantjes Consolidated	5,380	22.853	—	45
Brakpan Mines	21.390	90,859	2.787	—
City and Suburban	12,106	51,423	—	450
City Deep	29,479	125.219	4.206	—
Consolidated Langlaagte	16.154	68.618	—	1,474
Consolidated Main Reef	10,095	42.881	918	—
Crown Mines	66,339	281,790	13,941	—
Durban Roodepoort G.M.	3,431	14,574	68	—
Durban Roodepoort Deep	8.964	38,077	986	—
East Rand Proprietary Mines	56,060	238,128	12,166	—
Ferreira Deep	24,557	104.312	—	471
Geduld Proprietary Mines	10,284	43,684	3,925	—
Geldenhuis Deep	17.927	76,149	5,267	—
Ginsberg G.M.	4,217	17,913	119	—
Glencairn Main Reef	3,507	14,897	523	—
Government Areas	16,544	70,274	3,542	—
Jupiter G.M.	4,616	19,608	7,285	—
Knight Central	7,581	32,202	624	—
Knights Deep	21,132	89,763	5,097	—
Langlaagte Estate	14,173	60,203	654	—
Luipaardsvlei Estate	5,840	24,807	714	—
Main Reef West	6,793	28,855	221	—
May Consolidated	2,703	11,482	77	—
Meyer and Charlton	8,084	34.339	—	148
Modderfontein B.	23.737	100,828	4,035	—
Modderfontein Deep Levels	15,023	63,814	604	—
New Goch	7.016	29,802	455	—
New Heriot	5,730	24,339	768	—
New Kleinfontein	16,781	71,281	1,809	—
New Modderfontein	25.087	106,563	2,052	—
New Primrose	4,307	18,295	—	981
New Rietfontein	411	1,746	—	323
New Unified	3.353	14,243	149	—
Nourse Mines	17,265	.73,337	3,466	—
Princess Estate	6,781	28,804	926	—
Randfontein Central	62,314	264,693	18,125	—
Robinson G.M.	18,486	78,523	—	1,385
Robinson Deep	18,567	78,868	3,760	—
Roodepoort United Main Reef	7,684	32.640	1,368	—
Rose Deep	19,436	82,559	5,824	—
Simmer Deep	12,695	53,925	2,761	—
Simmer and Jack	17,468	74,199	6,418	—
Van Ryn Estate	11,188	47,524	—	114
Van Ryn Deep	18,543	78,766	102	—
Village Main Reef	4,783	20,317	—	34,474
Village Deep	18,497	78,570	199	—
Vogelstruis Estate	3.463	14,710	892	—
West Rand Central	579	2,459	—	387
West Rand Consolidated	9.928	42,171	3,045	—
Witwatersrand G.M.	13,000	55,220	2,085	—
Witwatersrand Deep	13,298	56,486	2,298	—
Wolhuter G.M.	10,450	44,389	926	—
Miscellaneous producers	—	10.891	3,465	—

OUTSIDE DISTRICTS.

	Ounces.	Value. £	Inc.	Dec.
Nigel G.M.	3,194	13,567	—	111
Sub Nigel	3,637	15,449	—	301
Barrett G.M.	404	1,716	204	—
Sheba G.M.	2,603	11,057	476	—
Worcester Exploration	1,009	4,286	1,143	—
Glynn's Lydenburg	1,579	6,707	531	—
Transvaal G.M. Estates	7,035	29,883	—	437
Ceylon Lydenburg	73	310	110	—
Quest G.M.	629	2,672	—	98
Fairview (T.C.L.)	708	3,007	—	731
Rietfontein (T.C.L.)	397	1,686	131	—
Miscellaneous producers	—	27,889	437	—

Group Profits.

Following is a list of the profits returned for August, September and October:—

	August.	September.	October.
Central Mining	£278,268	£269,962	£242,028
Rand Mines	197,227	193,366	194,959
Gold Fields	75,764	75,187	76,316
East Rand Proprietary ...	56,049	55,011	57,023
Kleinfontein	23,027	22,339	23,023
Barnato	136,953	130,527	129,397
Albu	63,860	65,257	67,539
Neumann	49,152	50,986	51,796
Mines Selection	32,812	31,022	33,111
Goerz	49,076	49,311	50,393
Totals	£962,188	£942,968	£925,585

Central Mining.

	August.	September.	October.
New Modder	£56,234	£57,762	£58,431
Robinson	41,160	38,403	37,197
Village Main Reef	26,009	25,668	*4,239
Bantjes	2,701	1,112	759
City Deep	62,227	60,066	60,501
Modder B.	62,889	61,160	64,182
Village Deep	26,598	25,771	25,197

Rand Mines.

Crown Mines	97,118	95,515	97,331
Durban Roodepoort Deep..	6,212	5,850	5,664
Ferreira Deep	42,482	50,887	43,031
Geldenhuis Deep	11,576	11,484	13,830
Nourse Mines	11,437	11,095	13,289
Rose Deep	28,402	18,535	21,814

Gold Fields.

Knights Deep	12,787	15,232	16,184
Robinson Deep	26,001	24,273	25,087
Simmer and Jack	30,132	28,514	29,069
Simmer Deep	4,343	4,042	2,441
Sub Nigel	2,501	3,126	3,536
Jupiter	—	*6,688	*315

* Loss.

East Rand Proprietary.

Angelo, Cason, Driefontein, New Comet ...	56,049	55,011	57,023

Kleinfontein Group.

New Kleinfontein	23,027	22,339	23,023

Barnato.

Consolidated Langlaagte ...	31,531	29,024	28,123
Ginsberg	4,193	4,169	4,039
Glencairn	2,135	2,430	2,656
Government Areas	17,880	15,216	16,059
New Rietfontein	930	—	—
New Primrose	6,165	6,077	5,016
New Unified	5,150	5,037	5,006
The Quest	520	420	227
Van Ryn Deep	43,330	43,119	43,061
Witwatersrand	24,819	25,035	25,210

Albu.

Aurora West	4,073	4,039	3,122
Meyer and Charlton ...	20,489	20,767	20,831
Roodepoort United M.R....	943	2,539	2,066
Van Ryn	19,442	19,599	19,647
New Goch	8,440	8,035	8,573
West Rand Consolidated...	10,473	10,278	13,300

Neumann.

Wit. Deep	16,068	16,034	16,050
Consolidated Main Reef ...	12,018	13,547	13,934
Main Reef West	3,697	3,671	3,839
Knight Central	3,348	4,062	4,053
Wolhuter	14,021	13,672	13,920

Cons. Mines Selection.

Brakpan Mines	32,812	31,022	33,111

Goerz.

May Consolidated	1,029	1,031	1,032
Princess Estate	616	756	607
Geduld	12,768	12,778	14,195
Modder Deep	34,663	34,746	34,559

Monthly Returns.

The following table gives the monthly returns for the past four years:—

	1912. Ozs.	1913. Ozs.	1914. Ozs.	1915. Ozs.
January	737,060	789,390	651,753	714,984
February	703,886	734,112	626,261	676,229
March	*830,723	790,552	686,801	753,935
April	737,660	784,974	683,877	744,080
May	779,662	794,306	720,229	763,548
June	753,936	747,077	717,926	755,280
July	766,338	655,389	732,485	770,355
August	764,737	728,096	711,918	778,763
September	747,893	706,186	702,170	776,750
October	768,681	718,431	733,746	797,631
November	757,337	673,486	715,836	
December	776,406	672,815	695,137	

* Including gold reserves extinguished.

City and Suburban.

The quarterly report of the City and Suburban Gold Mining and Estate Co., Ltd., gives the following particulars: Expenditure, £90,309 11s. 4d.; profit for quarter, £62,146 11s. 6d.; battery, 25,365.592 ozs. fine gold, £106,102 6s. 7d.; cyanide works, 10,957.829 ozs. fine gold, £46,353 16s. 3d.; total, £152,456 2s. 10d.; value of mill gold per ton, £1 0s. 10.425d.; value of cyanide works gold per ton, 14s. 4.330d.; cost per ton, £1 0s. 10.425d.; profit per ton, 14s. 4.330d. Stamps.—July, 155; August, 152; September, 150; average running time, 88.918 days; ore milled, 86,550 tons; milling duty per stamp per 24 hours, 6.302 tons; yield, 25,365.592 fine ozs.; yield per ton milled, 5.862 fine dwts. Cyaniding: 85,905 tons treated; yield. 10,957.829 fine ozs.; yield per ton treated, 2.551 fine dwts. The profit per ton of ore milled for the first and second quarters respectively was 15s. 4.084d. and 14s. 11.397d.

An Unfortunate Gold Mine.

In pursuance of a judgment of the Supreme Court, in the matter of J. W. Speis v Atbur, Limited, the sale of valuable gold mining machinery took place at the mine (Bongaspoort), some 45 miles south of Piet Retief, on Tuesday, the 26th ult, says the Ermelo paper. Mr. W. I. Deas, Deputy Sheriff, auctioneered the sale, and probably his pursuasive eloquence might have resulted in better prices had there been at least a handful of competitors present. Mr. G. W. Lines represented the plaintiff (Mr. Spires), and the whole of the lots were secured by him with little opposition. Inter alia, the 5-stamp Sandycroft battery, complete with plates, realized £4, and an excellent steam engine and boiler fell to the stroke of the auctioneer's hamber at £9. No interested parties of the Atbur shareholders were present, and the lots offered were without reserve and cash on the nail. We understand that it is the intention of Mr. Spies, who now owns all the movable and immovable property, to resuscitate mining operations at no distant date.

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LATEST MINING NEWS.

Cam and Motor Position—Jumbo—Scottish Mashonaland—Falcon Mines—

A smaller tonnage was treated at the Cam and Motor during September than in the preceding month and the grade was lower. This was due to a shortage of white labour and the closing of surface mullock passes. An improvement is looked for next month. Apparently the opening up of poor values during July in the main south drive of the No. 6 level in the Motor mine has induced the management to discontinue development work at this point, for no further details are given. The winze 580 ft. south (below the No. 6 level) has been sunk 35 ft.; but the width of the reef has declined from 56 in. to 40 in. and the average value from 79s. to 58s.

* * * *

Despite economies in management the directors of the Jumbo were not able last year to earn a profit, the result of operations being a debit balance of £7,744, increasing the amount as at June 30 to £84,844. To some extent matters were aggravated by higher costs of materials, more particularly mercury, cyanide, zinc, shoes and dies, and candles. Although a lower grade of ore was dealt with, extraction improved from 82·8 per cent. to 85·5 per cent., a very creditable performance. Expenditure was also higher on account of the developments in new directions on the company's surrounding properties. Generally speaking, however, the result of development work was disappointing.

* * * *

In consequence of the war the directors of the Scottish Mashonaland experience difficulty in valuing the investments; consequently they take in the report for the twelve months ended June 30 the making-up prices as at July 27, 1914. These show a depreciation of about 50 per cent. For the same reason the income from dividends has decreased, though some compensation was obtained by the increased royalty received from the tributing of mining claims. Expenditure has been cut down in order to meet the present situation. In the circumstances the reduction of the loan of £5,000 was out of the question.

* * * *

The Falcon return for September was remarkable in more than one respect, as will be gathered from an inspection of the subjoined figures:—

	Production.					
	Ore, tons.	Copper Short tons.	P.c.	Gold oz.	Per ton of ore, dwt	Est. val., £
January ..	12,650	253	2·00	3,017	4·82	25,721
February ...	11,643	214	1·84	2,701	4·64	22,300
March ...	13,956	263	1·88	3,033	4·35	26,380
April	13,589	284	2·07	2,924	4·31	26,700
May	12,578	272·5	2·17	3,003	4·77	26,592
June	12,722	298	2·34	3,031	4·76	28,052
July	13,147	309	2·35	2,978	4·53	28,298
August ...	14,354	308	2·14	3,265	4·55	29,477
September .	18,660	308	1·65	3,525	3·78	30,508

At the annual meeting it was stated that accessory plant was to be installed to raise the treatment to 15,000 tons per month, and this position was expected to be reached in April last. The latest return shows a sudden jump from 14,354 tons in August to 18,660 tons, a very satisfactory position indeed. On the other hand, the copper produced was less, doubtless attributable to the fact that 6,106 tons or about one-third, was oxidised ore. As no explanation is given it may perhaps be assumed that the tests made for the better economic handling of this ore have proved successful, because, as the chairman stated, "no steps will be taken towards mining it until we are assured that the treatment to be pursued will render the best results." Proportionately to the tonnage the gold production should have increased. As the reverse has happened, absorption by the new plant is possibly the reason. The net result is much better than it looks, because copper is fetching far beyond £56 per ton.

Gold in the Streets.

Maldon, in Victoria, is a not unimportant mining centre, and in January last a Government battery was installed, with results which have proved satisfactory to the Minister of Mines and the chief inspector. A cyanide plant, which is attached to the battery, is expected to start almost immediately, and in this connection the following extract from the *Australian Statesman and Mining Standard* is of interest:—"Recently a quantity of old tailings, probably from quartz crushed in the early fifties, was removed from under the roads at Maldon (V.), and treated by cyanide, and lately some was located under a butcher's shop in Main Street, and several loads have been disposed of."

Rooiberg Minerals Development Co.

Appended are particulars of the operations on this company's property for October:—Stamps, 10; days (24 hours) concentrating plant ran, 25·40; tons milled, 3,100 short tons; concentrates, 85 long tons; average assay value metallic tin, 68·56 per cent.; estimated profit, £1,572 12s. 4d.; adjustments in respect of previous shipments, to be added, £143 10s. 10d.; profit declared for the month, £1,716 3s. 2d.; net capital expenditure, £502 9s. 7d. The sum of £2,364 19s. 4d. has been included in working costs for the month in respect of shaft sinking, exploration and mine development. The average price of metallic tin on which the month's revenue has been determined is £153 5s.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

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Large area, which can be developed into big mine. Already produced over £40,000 gold. A good deal of dead work already completed. Twenty stamp mill and cyanide plant on property. Good workmen's dwellings, stores, offices, and manager's house. Within 10 miles station, Transvaal. £15,000 working capital ample for the present. Parties prepared to find all or part of capital of proposed company, apply to N.T., care *S.A. Mining Journal*, Johannesburg, for particulars, stating whether desirous of taking active part in management.

THE RECORD OUTPUT: GROUP RETURNS.

Details of Some Excellent Returns.

Rand Mines Group.

The following are the results of crushing operations of subsidiary companies for the month of October:—

Company	No. of Stamps Running	Tube Mills	Tons crushed	Estimated Working Costs per Ton	Total Fine Ozs	Total Estimated Profit.
Rose Deep	300	7	70,100	16/ 8·8	19,436	£21,814
Geldenhuis Dp.	300	7	59,000	20/ 7·2	17,927	13,830
Nourse Mines .	260	7	59,300	19/ 9·0	17,265	13,289
Ferreira Deep .	280	7	57,880	20/ 4·3	24,557	43,031
Crown Mines ..	660	26	221,000	16/ 2·1	66,339	97,331
Durban Rd. Dp.	100	3	27,000	23/ 5·2	8,964	5,664
Ttls. & averages	1900	57	494,280	18/ 1·2	154,488	£194,959

Ferreira Deep, Limited.—Reduced profit due to exceptional expenditure and decreased recovery.

The following are the results of crushing operations of Central Mining Companies for the month of October:—

Company	No. of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton	Total Fine Ozs.	Total Estimated Profit.
Modder B... ...	*96	6	45,500	15/ 2·5	23,737	£64,182
New Modder ...	180	7	53,000	17/ 4·1	25,087	58,431
City Deep... ...	†154	9	63,000	19/ 8·8	29,479	60,501
Village Deep ..	180	7	54,400	19/ 0·4	18,497	25,197
Village Main R.	160	4	11,200	43/ 1·3	4,783	‡4,239
Robinson	250	6	60,700	13/ 1·1	18,486	37,197
Bantjes Cons. .	100	3	20,490	21/ 1·3	5,380	759
Ttls. & averages	1120	42	308,290	18/ 2·0	125,449	£242,028

‡ Loss.

* Includes 16 Nissen stamps.

† Includes 4 Nissen stamps.

Village Main Reef.—Loss due to curtailment of tonnage owing to the recent accident and heavy expenditure in underground repair work which is proceeding satisfactorily.

Albu Group.

The following information is officially supplied regarding the October operations of the producing companies of the group:—

Company	Stamps.	Tons Crushed.	Total Cost.
Aurora West	80	15,200	£13,762
Meyer and Charlton	75	14,990	13,123
New Goch	120	30,700	20,937
Roodepoort United	80	34,931	30,365
Van Ryn Estate	140	38,810	27,567
West Rand Consolidated ...	100	31,750	28,480
	595	166,381	£134,234

Company.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	18/ 1·3	£16,884	£3,122
Meyer and Charlton	17/ 6·1	33,954	20,831
New Goch	13/ 7·7	29,510	8,573
Roodepoort United	17/ 4·6	32,431	2,066
Van Ryn Estate	14/ 2·5	47,214	19,647
West Rand Consolidated ...	17/ 11·3	41,780	13,300
		£201,773	£67,539

West Rand Consolidated.—The increased profit is due to what is regarded as a temporary enrichment of stopes.

Aurora West.—Operations were adversely affected by the breakdown at the end of September of one of the compressors, which was in process of repair during October.

Barnato Group.

The results of operations of the Barnato group for October are as follows:—

Mine.	Stamps.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte ...	100	54,100	£68,618
Ginsberg	75	15,800	17,911
Glencairn Main Reef ...	160	21,850	14,897
Government G.M. Areas ...	100	50,200	70,276
New Primrose	140	22,500	18,293
New Unified	60	13,750	14,242
Quest	35	3,542	2,671
Van Ryn Deep	80	40,260	78,769
Witwatersrand	215	43,130	55,222
October totals	965	265,132	£340,899
September totals ...	965	264,846	336,931

Mine.	Total Working Costs.	Working Costs per Ton Milled.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ...	£41,284	15·262	£28,123
Ginsberg	13,991	17·710	4,039
Glencairn Main Reef ...	12,447	11·393	2,656
Government G.M. Areas ..	54,638	21·768	16,059
New Primrose	13,411	11·921	5,016
New Unified	9,340	13·585	5,006
Quest	2,548	14·386	227
Van Ryn Deep	36,480	18·122	43,061
Witwatersrand	31,931	14·807	25,210
October totals	£216,070	16·299	£129,397
September totals ...	£210,691	15.910	£130,527

Monthly Gross Profits.—January, £126,738; February. £118,382; March, £128,225; April, £128,526; May. £131,577: June, £134,592; July, £135,782; August, £136,953; September, £130,527: October, £129,397.

Goerz Group.

Results of operations of the producing mines of this group for the month of October, 1915:—

Company	Stamps.	Tons Crushed.	Total Revenue.	Revenue per ton
Geduld Proprietary ...	60	27,200	£44,148	32/ 5
May Consolidated	100	14,500	11,470	15/ 10
Modder Deep Levels ...	60	34,700	63,581	36/ 8
Princess Estate	60	23,000	28,972	25/ 2
Totals	280	99,400	£148,171	—

Company.	Costs. Total.	Costs. Per Ton.	Profit.* Total.	Profit.* Per Ton
Geduld Proprietary	£29,953	22/ 0	£14,195	10/ 5
May Consolidated	10,438	14/ 5	1,032	1/ 5
Modder Deep Levels ...	29,022	16/ 9	34,559	19/ 11
Princess Estate	28,365	24/ 8	607	0/ 6
Totals	£97,778	—	£50,393	—

Geduld Proprietary Mines, Ltd.—Reserve gold, 4,431 ozs.

*Including Sundry Revenue.

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Mr. S. B. Joel's Optimism—A Graphite Factory—Foundries Expected to be Very Busy—Galvanised Goods Dearer—Order Goods in Bigger Packages—Electric Light Contracts, 25s. Each Light.

The event of the week in mining material circles has been the speech of Mr. S. B. Joel at the meeting of the Consolidated Investment Company. It is now recognised that these set official speeches at the annual gatherings of some half-dozen of our great corporations have become classic, as the various subjects are dealt with by the most expert technical men and subsequently reviewed chiefly from a financial standpoint by the several boards, before being placed before shareholders, and then subjected to public criticism. In trade notes it is obvious that a review of the whole speech would not be fitting, therefore it must suffice to make the bald statement that the speech, from first to last, was filled with encouragement from a commercial standpoint. It was forcasted that the diamond mines would soon be re-opened, not on so large a scale perhaps, but a start was to be made. Again, the Government Areas Company would soon have another 100 stamps (200 in all) at work, both of which must result in more trade. However, perhaps the most optimistic matter dwelt upon was the great and important prospects of the Far Eastern Rand. It was remarked that the excellent results from the New Modderfontein, Modder B., Modder Deep, Van Ryn Deep, and Brakpan, combined with the progress being made at Geduld, and the high values already exposed in the Springs Mines, as well as the more recent strike at Daggafontein, were all exceedingly promising. With such results being accomplished, it was maintained that never at any period in the history of the Rand has the public had such a number of good sound investments as is presented to it to-day by the bulk of the mines in this Far Eastern area. Such authoritative statements, backed up by a great Corporation, must of necessity enable merchants to gauge the position for the future and to arrange their indents accordingly; it also enables far-sighted men to govern their establishment charges with some degree of circumspection. Undoubtedly the whole keynote of to-day's position is contemplated expansion throughout the goldfields, the Pretoria diamond area, the Warmbaths tin district, then on to the Messina copper fields. Naturally it will take time, as the war clouds must show signs of rolling by before any great development can take place in the mining material trade, and then the whole world has to be brought under requisition for the best machinery for our use, so that the most economic results can be obtained to bring the lower grade mines into the profitable producing stage, as the rich mines can well take care of themselves.

Local Industries.

There is a decided feeling that since the war has extended to the Balkans, more and more difficulty will be experienced in obtaining goods from Britain, chiefly because of the restricted shipping facilities, a foretaste of which is already being felt in the upsetting of the regular running of the mail boats. Already the mines are placing more work with the local foundries and machine shops, also the big works allied with the electrical business, and in a lesser degree the motor fixings and repair shops are gradually brought under requisition to repair and manufacture machinery parts which cannot be obtained from oversea, at all events in a hurry. People who are in a position to fairly well judge say that in a few months' time all these hives of industry will be full of work, always providing the great war continues with unabating fury. In addition to this there are a good few factories springing up and extending themselves to supply things, difficult to obtain from oversea. For example, there is a graphite factory, employing about ten people at Jeppestown, going ahead nicely. The raw material comes from the Pietersburg district and is worked up into a variety of commercial products, such as foundry plumbago used in the production of castings, which readily fetches 5d. per lb., as compared with the imported article at 6d., and that only when it can be obtained. In pre-war times the oversea product was sold at 4½d. This graphite is also made into bricks of black lead, which is in good demand by the railway and tramways for use on the points and curves, and is sold at 1s. per lb. The railways also use black lead siftings, which comes out at only 2½d. per lb. The makers of these graphite preparations are very enthusiastic—and nothing can be accomplished without enthusiasm—that this new industry has come to stay, as the raw material is of excellent quality, which is the chief thing towards success.

Iron, Steel, Galvanised Roofing, etc.

Every mail brings forth the news that all iron, steel, galvanised goods, and such like, are increasing in price, brought about by the scarcity of labour in the factories, and an advance in wages generally. As regards galvanised roofing iron and galvanised piping and sundries, a special cable was received stating that a jump had occurred in values, owing to the shortage of spelter, hence a rise of about a farthing per foot here in anticipating events. A few months ago values here did not quickly respond to sharp advances at home, simply because stocks were plentiful, therefore sales would take place from stock and a sporting chance taken to replace same on the fluctuation of prices at the factories. However, this course cannot be adopted to-day as Johannesburg stocks are not sufficiently abundant to take such liberties. The price of imported bar iron has gone up 2s. 6d. per 100 lbs. as a reflex of the home position, mild steel bar is now quoted at per lb. instead of per hundred pounds, which is an indicator that prices keep gradually firming.

Timber, Bricks, and Building Material.

The price of deals has advanced slightly with the ever-present tendency to continue in that direction, so much so that it is difficult to buy anything like parcels at current rates. The day-to-day position is all right, but immediately the future is mentioned, holders are shy in answering, especially when they recognise that business is meant. For glazed bricks, drain pipes, and panelling tiles, orders are particularly slow, which is not altogether unusual at the approach of the year end, but on this occasion, it is much more so. There is a fair demand for ordinary bricks and a nice order was recently placed for over a hundred thousand at 36s. 6d. for building tenements in one of the suburbs, also other orders were given for improving and re-building the older houses and business places in town. As regards lime, the alteration in railway rates, to the advantage of lime burners as mentioned last week, has made the blue lime a trifle cheaper, notwithstanding the continued scarcity of cement, the orders for which are being executed, although there is some leeway yet to make up. Hence, rather a surprise that lime went temporarily cheaper, but the reason is not far to seek, as it appears that makers had been keeping stocks back in anticipation of the modified railway rates, and what usually happens, happened in this case that the position had been discounted.

Oils, Leads, Paints, etc.

A letter received from a British manufacturer per last mail states that owing to the shortage of labour and the greatly increased cost of small packages, such as ready-mixed paint tins, enamel tins, and varnish cans, it is desirable that customers should order their requirements in larger

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packages wherever possible, thus minimising delay. In any case considerable economy can be effected in this way, as almost invariably the larger the package the lower is the relative cost, quite apart from the consequent saving in freight. Locally, prices throughout the painting trade are the same as last week, with, however, a rising tendency, as it is difficult to get goods from oversea. The jobbing trade is excellent, particularly for furbishing the outside of residences and buildings.

Electrical Goods.

Three firms received good consignments of the smaller electric sundries during the week, but no more are expected until January, through the disarrangement of shipping. If this contingency really happens many lines will become acutely scarce, already cord grip lamp holders can hardly be obtained in wholesale quantities, and although the recognised price is 9s. per dozen, it is often nearer 12s. in actual dealings, also the ordinary fitting holders are getting scarce, and the worst feature is that both kinds are scarce in London and Holland. In connection with Holland, it is said that supplies of lamps arrive from there even more regularly than London. The authority who gave this information further remarked that there are three of the finest factories in the world in Holland for making electric light glasses, one of the principal factories having been originally opened there in consequence of the labour troubles in England. It started with about 300 hands, and now between seven thousand and eight thousand are engaged. Business in the contract line for new installations is excessively slack, as people put off everything they can on account of the extra advance of values as compared with pre-war times. The position is that contractors are asking about 25s. a light as compared with 15s. in July, 1914. As a matter of comparison, at to-day's prices the contractors would not have so much margin, as the difference of 10s. is more than swallowed up, the price of the materials having advanced quite 13s. a light.

Revised Price List.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 20s. 6d. upwards (local, do., 14s. 6d. upwards), angle 17s. 6d. to 18s. 6d. per 100 lbs.; mild steel bar, 2¼d. lb.; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles, 14 in., 4s. 6d., 16 in., 5s., 18 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 12s. 6d., 42 in., 15s. 6d.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7¾d. to 8d., 11 ft., 8½d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6¼d., 9 ft. 6½d., 10 ft. 6¾d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d. to 9¼d.; over, 9¾d. to 10d. (Oregon, 9¾d.); flooring, 4½ x ⅞ and 6 x ⅞, 4¾d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. 2d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 42s. 6d. ton on rail.

Oils, paints, lead, oxides, glass. Linseed, raw and boiled, 21s. to 22s. 6d. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 43s. 6d. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; carbon lamps, 7s. 6d. per doz.; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Welgedacht Exploration Co.,

LIMITED.

(INCORPORATED IN THE TRANSVAAL.)

Notice to Shareholders.

NOTICE IS HEREBY GIVEN that the Fourteenth Ordinary General Meeting of Shareholders in the Welgedacht Exploration Company, Limited, will be held at Salisbury House, London Wall, E.C., in the City of London, on the 7TH DECEMBER, 1915, at noon, for the following business:—

(1) To receive and consider the Directors' and Auditors' Reports, the Balance Sheet, and Profit and Loss Account, for the year ended 30th June, 1915;

(2) To elect two Directors in the places of Messrs. A. H. D. Cochrane and Thomas F. Dalglish, who retire in accordance with the provisions of the Articles of Association, but are eligible and offer themselves for re-election;

(3) To appoint Auditors for the ensuing year;

(4) To transact all such other business as may, under the Articles of Association, be transacted at an Ordinary General Meeting.

The Share Transfer Books of the Company will be closed from the 15th November, 1915, to the 7th December, 1915, both dates inclusive.

By Order of the Board of Directors,

O. F. BROTHERTON

(for the Witwatersrand Township, E., & F. Corp., Ltd., Secretaries).

Head Office,
The Jeppe Arcade,
Johannesburg,
5th November, 1915.

THE WEEK IN THE SHAREMARKET.

Business Quieter—Prices Remain Steady—Favourable Outlook.

SOME profit-taking after Mr. Joel's big speech on Tuesday caused a slight reaction in prices, and the war news in London also seems to have made tor quietness. Nothing, however, could long depress Barnato stocks, and they continue to enjoy increasing favour based upon the excellent position and prospects of the mines. The record output for October should have a most favourable effect in London; and it now looks as if the year's output as well as that of the month will make new records. It is not thought that the partial re-starting of operations at the diamond mines will much reduce the Rand's native labour supply; and the October level of gold production should, therefore, be maintained. Mr. Joel's speech, of course, gave unqualified satisfaction, except to those unreasoning people who expected to be promised a new heaven and a new earth. His references to the Far East were particularly welcome to the large number of people who recognise that had that district not turned out so splendidly there would have been by now something of an enforced exodus from the Rand. That the speculative situation has, undoubtedly, been saved by the Far East Rand is clearly conveyed between the lines of Mr. Joel's speech. The probable re-opening of some of the diamond mines will gradually infuse life into diamond shares, and already has had the effect of causing an enquiry for the lower-priced "lines." After the Barnato shares those of the ever-popular Modder group remains highest in favour. City Deeps are likewise in growing demand; and all the Rand dividend payers are reflecting the promise of good December dividend declarations. Tins remain a disappointingly weak feature. The price of the metal is, of course, bound to go better after and towards the close of the war; and quotations for the shares should mend in sympathy.

	Fri., 5th.	Sat., 6th.	Mon., 8th.	Tues., 9th.	Wed., 10th.	Thurs., 11th.
African Farms	8 0	8 0	7 10*	8 0	7 10	7 10*
Apex Mines	17 1½*	17 6	17 3	17 0*	17 0*	17 3
Aurora Wests	8 6*	—	—	—	8 0*	8 6*
Bantjes Cons.	4 9*	5 0	—	—	4 6†	3 6*
Brakpan Mines	66 6*	66 6	65 0*	67 0	66 0*	67 6†
Brick and Potteries	—	—	—	5 0*	5 0*	—
Cassel Coals	19 3*	19 3*	19 0*	19 0*	19 0*	19 0*
Cinderella Cons.	—	2 9*	3 3*	3 0*	—	2 9*
City and Suburbans	42 9*	43 0*	43 6*	43 0*	43 0*	—
City Deeps	68 0	68 6	69 0*	68 0*	68 9*	67 6*
Cloverfield Mines	6 0†	5 8*	5 9*	5 10	5 11	5 11
Clydesdale Collieries	13 6*	13 6*	13 0*	13 6*	13 6*	13 6*
Concrete Constructions	2 6†	2 6†	2 6†	—	2 6†	—
Cons. Investment	14 9*	—	—	15 6	—	—
Cons. Langlaagtes	38 6*	38 6*	38 9*	39 0†	37 6*	37 0*
Cons. Main Reefs	19 3	19 0*	19 0*	19 0*	19 3*	19 0*
Cons. Mines Selection	10 6*	10 6*	10 6	10 3	10 6*	10 3*
Coronation Collieries	25 0*	—	—	25 0*	—	25 0*
Coronation Freeholds	0 2*	—	—	0 2*	—	0 2*
Crown Diamonds	1 3*	1 9*	1 9*	2 0*	1 10*	1 10*
Crown Mines Debentures	£98*	£98*	£98*	£98*	£98	£98*
East Rand Centrals	3 0	3 0*	3 0*	3 0	3 0*	3 0*
East Rand Coals	1 10*	1 9*	1 4*	1 10*	1 10*	1 10*
East Rand Deeps	1 3*	1 3*	1 4*	1 4*	1 4*	1 3*
East Rand Minings	6 7*	6 6	6 7*	6 8	6 8*	6 8*
East Rand Props.	—	—	22 0*	—	22 0*	22 0*
Eastern Gold Mines	1 3*	1 6*	1 5	1 5*	1 5*	1 3*
Frank Smith Diamonds	1 4*	1 4*	1 5*	1 6*	1 9*	1 6*
Geduld Props.	33 9	33 9	33 9	33 6	33 6*	33 6
Glencairns	—	—	—	2 0*	—	2 0*
Glynn's Lydenburgs	10 6†	—	10 6	10 6†	10 6†	—
Government Areas	27 6	27 9	29 3	28 6	28 6	27 6
Jupiters	6 5*	—	6 5*	6 3*	6 1*	6 0*
Klerksdorp Props.	1 6*	1 6*	1 6*	1 6*	—	—
Knight Centrals	11 6	11 6	11 3	10 9	10 7	10 4
Knights Deeps	—	23 0*	23 0*	24 0*	24 0*	24 6*
Lace Props.	3 6	—	3 6	3 4	—	3 4*
Langlaagte Estates	16 6*	—	—	—	17 0*	—
Luipaardsvlei Estates	8 0*	8 0*	8 3	8 3	8 0*	8 0*
Lydenburg Farms	5 3*	5 5*	5 11*	6 3	6 1	5 9
Main Reef Wests	7 5*	7 4*	7 4*	7 1*	7 2*	7 2*
Main Reef West Debs.	£70	—	—	—	—	—
Meyer and Charltons	—	103 9	100 0	102 6*	—	102 6*
Middelvlei Estates	1 4*	1 4*	1 4*	1 4*	1 9†	1 4*
Modderfontein B.	116 9*	117 6A	120 0	119 0	119 0*	119 0
Modder Deep Levels	103 9	103 0	103 0	103 0*	103 0	103 6*
New Boksburgs	1 0*	1 0*	1 0*	1 3†	1 2*	1 1*
New Eland Diamonds	10 0†	10 0†	5 0*	7 9*	7 9*	8 0*
New Era Cons.	—	6 10*	6 10*	7 0	6 10*	7 0
New Geduld Deeps	2 6*	2 6*	2 7*	2 6*	2 7*	2 8*
New Heriots	—	—	—	57 6*	—	—
New Kleinfonteins	—	24 9	24 9	24 3*	24 6*	24 3*
New Modderfonteins	307 6B	315 0	310 0	317 6†	—	315 0B
New Rietfonteins	0 3*	—	0 3*	0 3*	—	0 3*
New Unifieds	—	—	16 9*	—	17 0†	—
Premier Deferreds	92 6*	—	—	—	—	—
Pretoria Cements	44 6C	45 0*	45 0*	—	—	47 6†
Princess Estates	3 0*	3 0*	3 3	—	—	2 6*
Rand Klips	4 5	4 5	4 8	4 8	4 7	4 6*
Rand Nucleus	1 5*	1 9†	2 0	1 4*	1 4*	1 4*
Randfontein Deeps	3 0*	3 0*	3 0	—	2 6*	2 8*
Randfontein Estates	11 6*	—	12 0	12 0*	12 3*	12 0*
Robinson Deeps	21 0*	—	—	—	21 0*	—
Rooiberg Minerals	14 0*	14 0*	14 3	14 0*	14 0*	14 3
Roodepoort Uniteds	3 3*	3 0*	—	3 3*	—	3 0*
Shebas	1 6*	1 6*	1 6	1 6*	1 6*	1 6
Simmer Deeps	1 9*	1 9*	2 3	—	2 3†	—
S.A. Breweries	32 0†	32 0†	—	—	32 0†	—
S.A. Lands	2 9*	2 9*	2 9*	2 10	2 9	3 0†
Springs Mines	28 0*	28 9	28 6	28 6	28 3*	28 6
Sub Nigels	9 9*	11 0	11 0*	11 0*	10 9*	10 6*
Transvaal Coal Trust	42 6	—	41 6*	41 3*	41 0	40 9
Transvaal G.M. Estates	26 6*	26 6*	—	—	—	—
Van Ryn Deeps	57 3B	57 3	57 9	57 9	58 0	57 6*
Village Deeps	34 0*	34 0*	—	34 0*	—	—
Vogelstruis Cons. Deeps	0 8*	0 8*	0 8*	0 8*	0 8*	0 8*
West Rand Cons.	—	8 6*	—	—	—	—
Western Rand Estates	1 0*	1 2*	1 0*	1 3†	1 6†	1 6†
Witwatersrands	56 0*	57 0	57 6	—	58 0†	58 0†
Witwatersrand Deeps	27 0*	27 6*	27 9	27 0*	28 0	27 6*
Wolhuters	10 3*	10 6*	10 9†	10 3*	10 3*	10 3*
Zaaiplaats Tins	12 0*	12 0*	12 0*	11 6	11 6	10 0*
Union S.A. 3¾%	—	—	—	£98	—	—
Union S.A. 4%	—	—	—	£98 9s.†	—	—

A Ex London. B Odd lots. C 50 shares. * Buyers. †Sellers.

New Modderfontein Gold Mining Co.,

LIMITED.

(Incorporated in the Transvaal.)

Notice of Extraordinary General Meetings.

NOTICE IS HEREBY GIVEN that an Extraordinary General Meeting of Shareholders in the above Company will be held in the Board Room, 2nd Floor, The Corner House, Johannesburg, **on the 14th day of January, 1916, at 12 o'clock mid-day**, when the subjoined resolution will be proposed:—

That each of the existing £4 shares be divided into four £1 shares, upon each of which the sum of £1 shall be credited as paid up. That the certificates of shares and share warrants be called in by the Directors and cancelled, and that new certificates and share warrants be issued, subject to the provisions contained in the Company's Articles of Association.

Should the above Resolution be passed by the requisite majority, it will be submitted for confirmation as a Special Resolution to a further Extraordinary General Meeting, which will be held on the 9th day of February, 1916, at the same time and place.

The Share Register of the Company will be closed from the 14th day of January, 1916, to the 20th day of January, 1916, both days inclusive.

Holders of Share Warrants wishing to be present or represented at either or both of the Meetings should deposit their Share Warrants (or may at their option produce same) at the places and within the times following:—

(a) At the Head Office of the Company, The Corner House, Johannesburg, at least twenty-four hours before the time appointed for the holding of the meeting or meetings at which they desire to be present or represented.

(b) At the London Office of the Company, No. 1, London Wall Buildings, London, E.C., at least thirty days before the date appointed for the holding of the meeting or meetings at which they desire to be present or represented.

(c) At the office of the Credit Mobilier Francais, 30 and 32, Rue Taitbout, Paris, at least thirty days before the date appointed for the holding of the meeting or meetings at which they desire to be present or represented.

And must otherwise comply with the "Conditions as to the issue of Share Warrants" now in force.

Upon such deposit or production certificates with Proxy Forms will be issued, under which such Share Warrant holders may attend the meeting or meetings either in person or by proxy.

By Order of the Board,
RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

Head Office: The Corner House,
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November 12th, 1915.

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The Week's Meetings.

JOHNNIES.

MR. S. B. JOEL'S SPEECH,

ASSETS OVER FIVE MILLIONS.

FAR EAST RAND PROSPECTS.

RESTARTING THE DIAMOND MINES

Mr. Imroth on Industrial Development.

The attendance at the annual general meeting of the Johannesburg Consolidated Investment Company, Ltd., on Nov. 9th, indicated the extraordinary interest that was taken in the speech that was to be made by the permanent chairman of the company, Mr. S. B. Joel. At half-past 11, the time for which the meeting was called, the board-room of the Consolidated Buildings was filled. When Mr. Joel, accompanied by his co-directors, entered he was warmly greeted. The necessary preliminaries of reading the notice calling the meeting and the certificates of the auditors on the accounts did not occupy much time. Mr. Joel's speech was closely followed, whether in discussing industrial detail, economic conditions, municipal taxation, town development, diamond mining, and finally the Imperial connection and relationship between the industry and the war. Mr. Joel spoke for an hour, and at the conclusion of his speech there was general applause.

Among those present were Mr. S. B. Joel (chairman), Sir T. Cullinan, Sir Geo. Albu, Messrs. J. Emrys Evans, C.M.G., G. Imroth, J. Munro, H. Newhouse, Rothschild, A. Anderson, Charles Marx, H. A. Rogers, P. Richardson, A. French, J. H. Ryan, W. H. Dawe, H. C. Boyd, W. Ross, W. Dalrymple, E. Esselen, J. Andrew Cohen, C. Aburrow, A. Sprinz, A. Aiken, E. Chappell, H. A. Young, G. Beves, E. Brayshaw, S. C. Black, W. J. Corder, E. W. Bond, G. A. Denny, H. H. McNeil, P. Wimble, A. E. Button, W. M. Bielski, I. Myers, J. H. L. Manisty, F. R. Lynch, T. Eddington, N. W. Anderson, R. Abrahams, A. Hymann, H. A. Baily, S. Solomon, P. Dreyfus, S. Abraham, W. E. Ferryman, W. E. Goldby, L. Hoon, A. Wilks, B. Solomon, Sullivan, H. E. Lewis, H. Haines, I. Kantor, A. O. Wright, G. Sonn, L. Marks, Whitelaw, A. C. B. Meiklejohn, J. Atherton, R. M. Connolly, W. S. Barclay, J. Ferris, W. Lusted, J. Marshall, Col. P. R. McDonald, G. C. Fitzpatrick, J. Dale Dace, M. A. Zoccola, Johnston, S. R. Potter, Newman, A. L. White, Chesterton, Fitzgerald, J. R. Grewer, E. M. Hyman, J. Mitchell, J. Neilson, G. M. Pemberton, R. S. Reid, Rutherford, W. S. Webber, C. H. Wentzel, F. F. Steed, A. C. Bleksley, and W. H. Mardall, secretary.

CHAIRMAN'S SPEECH.

The Chairman said: Gentlemen,—After an absence from South Africa of ten years, it is a great pleasure to me to be amongst you in Johannesburg again, and to be able to preside at our meeting to-day. Although the exigencies of your company's interests necessitate my headquarters being in London, I trust I need not assure you that South African affairs, and more particularly those of Johannesburg, are always of the greatest interest to me, and at all times receive my most careful and constant attention. I know that you in South Africa have all felt the strain of the great war in which the British Empire is now engaged, and you will, therefore, all the more readily realise that the task in London of safeguarding your interests during the troublous times through which we are passing is no light one, and demands the most constant watchfulness and care from your Directors on that side. When I last had the pleasure of addressing you in 1905, and strongly advocated the absorption by your Company of the Barnato Consolidated Mines, Ltd., I was subjected to a considerable amount of adverse criticism, I might almost say abuse, as to what was said to be "shadowy" and "speculative" business. I have sometimes thought, gentlemen, that perhaps the magnitude of the transaction was not fully realised and appreciated by my critics. Out of the assets we acquired from the Barnato Consolidated Mines, and for which we issued 1,200,000 shares, we have since received by way of profits on realisations and dividends nearly one and three-quarter million pounds, and the assets taken over which we still have remaining on hand include Van Ryn Deeps, Consolidated Langlaagte Mines, Ferreira Deeps, and others which are to-day amongst the principal revenue producing assets of the Company. These facts, gentlemen, I think are a sufficient vindication of the policy which at my instigation you adopted.

Development of the Town.

It is most interesting to me to observe the progress that has been made during the past ten years in the development of South Africa and the growth and expansion of Johannesburg with which I have been intimately associated since its infancy. In every quarter of the town handsome and massive buildings have been erected which would be a credit to any city in Europe, and which stamp Johannesburg as the great distributing centre it has become, and which, I trust, it will remain. In the suburbs, more particularly on the Berea and Houghton Estates, to which I shall presently refer, the development has been truly extraordinary, and I am informed that further development in this direction is proceeding, though naturally at present not so rapidly, on account of the difficult times through which we are passing. It is also pleasing to note that after two years of local depression due to strikes, riots, and rebellion, the trade of the town is rapidly improving and returning to its normal condition. To the progress and improvement of the mining industry, with which the welfare of your Company is so closely interwoven, I will refer later on.

The directors' report and statement of accounts for the financial year ended the 30th June, 1915, are in your hands, and I will proceed, as is customary, to deal with the principal items.

Company's Financial Position.

The financial position of your company and your various interests have so materially altered since I last had the pleasure of addressing you in 1905, that any comparison ot the figures then submitted with those now before us would be of little or no value. The Chairman, at your last annual meeting, gave you some very interesting figures as to the growth and progress of the company during the twenty-five years of its existence, figures which, gentlemen, I think you will agree with me were truly remarkable. I shall, therefore, confine myself to a comparison of the figures submitted to you to-day with those as at the 30th June, 1914.

The issued capital of your company (£3,950,000) is the same as at the 30th June, 1914.

Your reserve fund of £250,000 remains intact.

Sundry Creditors, £514,302.—A small increase is reflected under this heading of £40,000. This account represents the ordinary cash transactions and current accounts of your Company, and naturally varies from month to month.

Contingent Liabilities, £56,799.—An increase is here shown of £12,500, which represents the surplus of the commitments of your company over liabilities discharged since the 30th June, 1914. You will note that the total of your contingent liabilities is infinitesimal in respect to the amount of liquid assets.

Assets.

Turning to the asset side of the balance sheet:

Investments in Stocks and Shares, £2,919,110.—This account shows a decrease of £303,000. This decrease reflects the amount of the depreciation written off your shareholdings as at the 30th June, 1915. Of this sum, approximately one half is represented by the depreciation in the value of the shareholdings in diamond mining companies. Following our invariable custom, the "book value" of your share investments has been written down at the "market value," os far as could be ascertained, at the close of our financial year. It is not unreasonable to hope that the larger portion of this depreciation, especially that applicable to our diamond mining interests, will, with the recovery of the diamond market and the reopening of the mines, ultimately be recovered. In reviewing our accounts as at the 30th June, 1914, the chairman informed you that your directors had thought it advisable to write off the sum of approximately £215,000, reflecting the depreciation in our shareholdings as at that date. These amounts make a total depreciation written off for the two years ended the 30th June, 1915, of over half a million sterling. These, gentlemen, even with a strong corporation such as ours, are figures of some magnitude, and I more particularly emphasise them to you to-day to prove the strength of our financial position in so far that we have been able to meet this big depreciation out of profits earned without encroaching upon our reserve fund or reducing or passing our dividend. It would, of course, be very pleasant to your board not to have to provide for this depreciation out of our profits and to have the amount at our disposal for distribution to the shareholders in the form of increased dividends, but I am sure you will unanimously endorse the prudent course adopted by your board of directors in making ample provision for all possible contingencies. The appreciation, that is the surplus of the "market value" over the "book value" of other of your shareholdings as at the 30th June last, was considerably over £1.000.000. No credit has been taken in our accounts for this surplus.

Mining Properties and Advances to Mining Companies, £58.349.—The decrease reflected under this heading of £5.076 is accounted for by the partial repayment to us of certain loans to mining companies and the realisation of claims which we disposed of at a good profit. In this connection the tribute under which the New Spes Bona Gold Mine has been worked has now come to an end, and that company will shortly be placed in liquidation. During the tribute the New Spes Bona Company reduced its indebtedness to this company by £31.825; the balance of the loan must be regarded as bad, but has long since been provided for.

Real Estate and Buildings.

This item in your accounts may be classed under the following heads:

Johannesburg properties	£363,369
Johnbrg. suburban properties ...	141,493
Other properties in S. Africa	33,267
Properties in Austin Friars, London	104,969
	£643,098

The last Municipal Council valuation of your Johannesburg properties for assessment purposes was £835,910, a surplus of £331,000 over their book value. As compared with the figures at the 30th June, 1914, this account shows a decrease of £7,790, which reflects the annual amount written off, in accordance with our usual custom, for the redemption of our investments in ground rents plus the "book value" of the residential sites on your suburban estates sold during the financial year. Your revenue from ground rents at date is approximately £14.000 per annum. Owing to the depressed conditions which have recently prevailed, the property market has naturally been more or less stagnant, but I think we have every reason to be satisfied with the business done during the year. With the return of more settled conditions, the demand for building sites on our estates is steadily increasing, and it is pleasing to note that a considerable number of residences are in course of erection. It is difficult to realise that, what a few years ago was bare veld, is now occupied by the flourishing and well-laid out townships of Yeoville, Berea and Houghton, and I venture to say that the result achieved is in no small measure due to the sympathetic care with which your directors have administered this department and the generous terms granted to those who purchase ground from the company and build on our estates. This policy we intend to continue, more particularly to purchasers of ground on the Lower Houghton Estate.

I am pleased to learn that the Houghton Estate Golf Club, which our company inaugurated, has turned out an unqualified success, and that the course is greatly appreciated by members and the residents on our northern suburbs, and I trust it will be instrumental in the further development of this portion of the estate.

As stated in the directors' report, the revenue derived from our town properties during the period under review has been adversely affected by the conditions recently prevailing in Johannesburg. The rental received from your town properties at date is approximately £35,000 per annum. With a view to assisting the tenants of our various properties it was found necessary in many cases to grant substantial temporary rebates of rental, but with the return of normal conditions it is to be hoped that the rent roll will steadily improve. Your property in London is a most valuable assert and continues to yield a satisfactory return.

Basis of Municipal Taxation.

Your corporation has such a large stake in town and suburban estates within the municipal area that I think I am justified in referring for a moment to matters municipal. We contribute annually to the revenue of the town a sum of approximately £15,000 for assessment rate alone, and for other rates, such as light, water, etc., about £6,500 per annum. The municipal elections take place to-morrow, and I sincerely trust that the new Council then elected will bear in mind the policy I so strongly advocated when I last addressed you at your meeting in 1905 of exercising the greatest care and economy in the expenditure of money raised by the Municipality either by way of loan or taxation. The burden of municipal taxation on property holders in your town is very heavy and must prove detrimental to its future development. The incidence of municipal taxation has always been and always will be a most difficult and intricate problem to deal with, but it is one that must be faced resolutely and firmly. The main factor to be considered being, of course, to determine what proportion of municipal expenditure for permanent improvements should be borne by ourselves from revenue and what proportion by posterity by way of loan. The majority report of the Local Government Commission recently issued should, I think, once and for all dispose of the agitation by certain parties for the alteration of the basis of municipal taxation. I think it is indeed a very healthy sign to see Labour represented on the Municipal Council, as it denotes the keen interest taken in the welfare of the town by that section of the community, but I must admit that I am somewhat disappointed that of late years more of your prominent citizens have not displayed an equal interest by coming forward to seek municipal honours. I am fully aware that a seat on the Municipal Council is not altogether a "bed of roses." The sacrifices of time involved is very considerable, and the task as a whole is a somewhat ungrateful one.

As regards our large interests at Lourenco Marques, I can only say that I trust that when more settled conditions prevail, our properties in that town and the surrounding neighbourhood will greatly appreciate in value.

Carlton Hotel.

It is to be greatly regretted that the Carlton Hotel has not turned out the financial success that was anticipated. The hotel has been one of the greatest sufferers from the recent unrest and depression but I am pleased to learn that the business is now showing signs of steady improvement. The chief item militating against its success is undoubtedly the enormous amount payable to the Municipality for rates and taxes, and I sincerely trust the Council may see its way to grant us some relief in this direction. The hotel, as you are doubtless aware, has always been run at a heavy loss and has yielded no return on the large amount of capital employed. This naturally cannot continue indefinitely and if no improvement can be looked forward to in the near future, your directors will reluctantly have to consider the advisability of closing the establishment, a step which I am sure we should all regret and which would undoubtedly be not only a great loss to the comfort of the community at large but would seriously affect the prestige of the town.

Loans on Mortgage on Real Estate, £148,948.—The decrease under this heading of approximately £20,000 represents the repayment of certain loans under bond and the amount of instalments paid on account of purchase price of ground. It is very satisfactory to note that all your building loans are amply secured and it was not found necessary, at the close of our financial year, to provide for any bad or doubtful debts in this connection.

Pre-War Loans, £465,657.—There is one item in the balance sheet which is entirely new, and which is occasioned by the outbreak of the European War, viz., the item of £465,657 3s. 4d., which is described as "Pre-War Loans against securities subject to the Treasury and Stock Exchange Regulations." I may add that these loans have been made to firms on the London Stock Exchange of the highest standing and there is every reason to anticipate that the whole of them will be recovered in full.

Loans at Short Call on Market Securities, £418.323.—A decrease is here reflected on last year's figures of £172,000. You will readily understand that, owing to the conditions that have prevailed, we have not had much opportunity of utilising our funds in this direction.

Sundry Debtors and Dividends Accrued, £363,224. — The increase here shown of £78,000 is chiefly due to increased dividends declared by mining companies in which this company is largely interested. The remaining items do not call for special comment.

Financial Strength.

The total "book value" of your assets at the 30th June, 1915, was £5,074,820, reflecting a small increase of £32,000 on last year's figures, and showing a surplus over your liabilities, exclusive of the dividend of 5 per cent. declared on the 21st June last, of £4,560,518. This surplus is *exclusive* of the appreciation of your shareholdings over their book value of considerably over a million pounds sterling, to which I have previously referred. Gentlemen, speaking in all moderation, you must admit that this position fully establishes the financial strength of our Corporation. I think it may also be regarded as another strong factor in the strength of our financial position that, apart from the amount of approximately £500,000 temporarily locked up, to which I have referred, your absolutely liquid assets, amounting to £833,000, are only £100,000 less than they were at the 30th June, 1914.

Profit and Loss Account.

Turning to the profit and loss account, the profit for the financial year ended the 30th June, 1915, amounted to £224,911, being only £5,466 less than the previous year. Our working expenses for the year amounted to £34,919, an increase of approximately £4,000 on last year's figures, but you will note that included in our working expenses this year are war donations, and I am sure you will not begrudge the amount your Board of Directors have thought fit to donate on your behalf in this direction. This leaves us a net profit of £189,992, which, together with the sum of £170,525 brought forward from the previous year, gives a total of £360,518. Of this amount, the dividend of 5 per cent. declared on the 21st June, and paid on the 28th September, absorbed £197,000, leaving an amount of £163,018 to be carried forward to next year, which is only about £7,000 less than the previous year's figures. In considering these figures you must bear in mind that war was declared on the 4th August, 1914, and that the period covered by the accounts now before you may correctly be described as a "war period." The Stock Exchanges of the world were closed for a considerable time, and a general dislocation of business inevitably ensued. The profit earned, therefore, is exclusive of any extraneous aid we might have derived from share transactions had the times been more propitious. I, therefore, think you will agree with me that the result achieved must be regarded as highly satisfactory. This, gentlemen, concludes my review of the balance sheet and profit and loss account, and the financial position of the company, and I only trust you are as well satisfied with the same as I am. I feel confident in saying that the statement I have submitted to you compares most favourably with that of any other South African Corporation operating within our sphere of action.

Alliance Assurance Co., Ltd. — Amongst our many and varied agencies we are, as you are aware, the local representatives of the Alliance Assurance Co., Ltd., one of the largest and most important of assurance companies in the world, with assets exceeding twenty-four millions, and an annual premium income of a million and a half. The agency is conducted with profit to ourselves and satisfaction to the Alliance Assurance Co.

South African Breweries.

In this concern, which I may rightly describe as one of the most important of all our Colonial industries, we have a considerable interest. It has been most interesting to watch its progress and development from what only twenty-five years ago was a small local business in Maritzburg, with a capital of £35,000 and assets valued at £49,000, to the position it occupies to-day, with a capital of two million pounds and assets of approximately three millions sterling, and with breweries established in all parts of the Union and Rhodesia. I would here wish to express my deep regret at the death of the Chairman, Mr. F. Mead, the originator of the company, who always took the greatest interest in its operations from its inception. The company has already opened up business in West and East Africa, and I hope it may shortly be found possible for the brewery to extend its activities in these territories, where, I am given to understand, the climatic conditions are extremely favourable to a large consumption of the article produced.

Although I am glad to say agricultural and other industries are steadily progressing, the gold and diamond mining industries must be regarded as the main pivot round which the whole of the Union of South Africa is working and which supply by direct or indirect taxation, the largest portion of the revenue of the Union.

GOLD MINING COMPANIES.

I will now refer to the gold mining companies of the Barnato Group, and certain other companies in which we hold important interests.

Consolidated Langlaagte.

The returns from this mine have been so consistently good since the beginning of the year that the company was able last June to increase the half-yearly dividend from 10 per cent. to 12½ per cent., and at the same time redeem £75,000 worth of debentures. The gross profit for the first nine months of 1915 averaged over £31.000 per month, as compared with an average of £26.485 for 1914, and for the same period working costs were reduced from 14.778 shillings per ton to 14.335 shillings per ton. The ore reserves stand at a higher figure than they did at the end of 1914, and it is satisfactory to note that the values of the Reef exposed have been maintained. Looking at the development of the southern section as a whole, some fluctuations in grade have been experienced, but of the total area developed the percentage payability is high and the reef exposures in the bottom levels have been just as encouraging as those in the upper workings of this section. We have a large area of ground to the south still to be opened up, and the policy of the company will be to push on with the shaft sinking and developing of this area without intermission. The position to-day is a particularly sound one. The payable reserves fully developed amount to some 2½ million tons, and in addition there are large areas of ground both north and south of the dyke which are known to contain payable ore, but which have not been blocked out and for this reason are not taken into the reserves. It can be safely stated, therefore, that we have in sight sufficient ore to keep the mill running at its full capacity for a considerable number of years to come. During the last three months there has been a slight decline in the monthly profits, which, however, is only temporary, and this is due to an increase in working costs on account of a surplus of native labour. The same experience has been the lot of most other companies. This excess of native labour is a phenomena which I may say the Rand has never before experienced, and is attributable in the main to the release of a large number of natives normally employed by the diamond mines.

Ginsberg Gold Mine.

The profits realised at this mine have shown an improvement during the last few months and it is likely that the profit for 1915 will be approximately the same as that realised in 1914. The development of the mine is nearing completion and increased attention has recently been paid to areas in the northern section, which in times past had been considered as unpayable. Exploratory work in the south section has also shown that the possibilities of this portion of the mine are not yet exhausted. Generally speaking, it may be said that at the present time the outlook for the Ginsberg Mine is quite promising.

Glencairn Main Reef Gold Mine.

This company continues to make a small profit. The monthly average this year is lower than that for 1914, but this is no more than what had to be expected as the exhaustion of the payable reserves continues.

Government Gold Mining Areas.

Coming to the Government Gold Mining Areas, this mine, comprising an area of 2,633 claims, is the latest, as well as the biggest, and in many respects the most important under the control of the Johannesburg Consolidated Investment Company. It of particular interest to the country by reason of the fact that a large number of the shares are held in South Africa; and, further, that this is the first producing mine on what is known as Government ground, and that the Government itself is largely interested in the success of this proposition. Crushing operations on this property were started in October, 1914, and a steady improvement has been shown. For some months past the 100 stamp mill has been run to its full capacity from the mine, but present results should not be looked upon as indicative of what the mine will do later, as, in preparation for the enlarged plant—another 100 stamps—a great deal of excess development is being done, increasing the working costs, and a large amount of construction work is also being carried out underground. I am satisfied that a very material decrease in cost of production will be shown when the increased plant is in operation.

A most satisfactory feature on this vast property is the consistent improvement of the development. Reef of good width and excellent value is being disclosed, and present indications point to an average stoping width for the property of not less than six feet. These results have, naturally, had a most beneficial effect on the ore reserves, so much so that at the end of the last financial year the reserves were given as 2.451.581 tons of a value of 5.8 dwts. At 30th September last they had not only increased to over three million tons, but their value had risen to 6.6 dwts. A simple calculation, gentlemen, will show you the extent of the improvemen disclosed in the development of the mine. Development is being pushed ahead vigorously in preparation for the increased plant, which we anticipate will be ready about the middle of next year. The chairman of the Government Gold Mining Areas at its last annual meeting informed shareholders that the doubling of the reduction plant necessitated a rearrangement of the finances, and gave full details of the arrangements made. I wish to take this opportunity to say that the lenders have agreed to accept the repayment of the loan over a period of years, and it is the present intention of the board of the Government Gold Mining Areas to accept this proposition, so that all but a small proportion of the company's share of profits will become available for distribution in dividends. I should here mention the scale for division of profits between the Government, as owner and lessor of the minerals, and the lessee. The working of the scale has revealed a defect which was unnoticed when the agreement was entered into. The effect of this is that the scale operates prejudicially to the improved working of the mine, and the lessor therefore suffers disadvantages as well as the lessee. I have every reason to believe that ways and means may be found to rectify this anomaly.

Far East Rand.

The public has recently taken a very keen interest in what has come to be known as the Far East Rand, and when we look at the excellent results which have been shown by the New Modderfontein, Modder B, Modder Deep, Van Ryn Deep and Brakpan, combined with the progress being made at Geduld, and the high values being exposed in the Springs Mines and the more recent strike at Daggafontein, there is every reason for optimism. Viewing the position as a whole, too great emphasis cannot be laid on the persistence with which high values have been traced from one mine to another in this district, and I can safely say that never at any period in the history of the Rand has the public had such a number of good sound investments as is presented to it to-day by the bulk of the mines in this area. I think, gentlemen, that my exposition in regard to the condition of this mine and its prospects will satisfy you that we have every reason to look forward to a very prosperous career for this company.

New Primrose.

The grade of the ore worked at the New Primrose has been considerably lower than for 1914 and profits have shown a corresponding reduction. With old and extensive workings, such as we have at the New Primrose, a certain amount of caving is unavoidable which disorganises the work of the mine, in creases costs and causes fluctuations in grade. At the present rate of depletion there is sufficient ore remaining in the mine to keep the mill running profitably for some years.

New Unified.

It is indeed very pleasing for me to again be able to report a further recraction in the working costs on this property. For the first nine months of this year the working costs were 12.865 shillings per ton as compared with 13.882 shillings per ton in 1914. Our policy has been as the working costs have been reduced to work lower grade reef and by this means considerably lengthen the life of the mine. At the present time 50 per cent. of the ore mined is being taken from the main reef footwall. Two or three years ago the profitable milling of this reef would have been impossible at the then costs. There has been no depletion of the measured ore reserves, which at the end of September, stood at 371,131 milling tons. The directors felt justified some time ago in adding another tube mill to the reduction plant, and it is hoped this will effect a reduction in the value of the residues and will also enable us to treat a slightly bigger tonnage per month.

Van Ryn Deep.

The profits for the current year have averaged £43,665 per month and working costs, though not high, have been slightly above our anticipation, due to the fact that a certain amount of dead work had to be done in the mine which has been charged out each month. The incline shafts have been sunk continuously through the year, and they are now within measurable distance of completion. There still remain the bottom stations and the ore bins to cut, but the whole of this work should be completed soon after the middle of next year, and the working of the mine greatly simplified. Development has been pushed fairly hard during the year, the average footage per month being over 1,100 feet. Reef widths as we go east and south in this mine are getting bigger, and in the upper levels payable top leaders are being opened up in several places, with the result that stoping widths originally estimated to be from 4ft. to 5ft. are now as much as 6ft. and 7ft. The values obtained from development for the first nine months of this year have been excellent. Of the footage on reef, 82 per cent. was payable, having a value of 24.9dwt. over 24 inches. The future of this mine looks very promising indeed. In common with all mines in this district there are distinctive features which make for permanency of output and consequent security to investors. I feel confident that we have not reached anything like the maximum amount of profit and the shareholders can be heartily congratulated on the results so far obtained and the very satisfactory outlook.

Witwatersrand Gold Mine (Knights).

Good profits continue to be realised at the Witwatersrand Mine. The first nine months of 1915 the monthly profit has averaged £25,031 as compared with an average of £24,635 during 1914. Working costs, have, I regret to say, been somewhat higher, due to a variety of causes, but this has been more than compensated for by the higher grade of the ore coming from the mine. The erection of the sorting and crushing plant at the vertical shaft is nearing completion, and it is hoped to have the plant in operation about the end of next month. This will enable a larger tonnage of ore to be sent to the mill from the southern section and will probably increase the monthly tonnage crushed. It will also relieve the present congestion at the main shaft and generally improve working conditions. The opening up of the southern section has been pushed vigorously during the year ,the incline from the vertical shaft having been sunk 629 feet since the end of 1914. As was pointed out at the annual meeting of the Knights Company, the reef in this section fluctuates in value and poor patches are occasionally encountered, but at the 23rd level the reef has been intersected showing quite good values, and the west drive on the 22nd level has also passed into payable ground. The latest information to hand shows that the east drive at the 23rd level has been extended 30 feet in reef, averaging 10.6dwts. over 42 inches. These results, combined with the results obtained by the Wit. Deep in the adjoining ground, augur well for the immediate future and particularly for the block of 16 claims on our eastern boundary, which was recently included in our mining area in accordance with the arrangement come to with the Wit. Deep and the Chemical Company. During the year the payable ore reserves have been increased by some 60,000 tons and from all the information available, I have every confidence in predicting continued prosperity for this concern.

When we consider the present position of the gold mining companies of the Barnato Group I think we have every reason to congratulate ourselves on the manner in which we have overcome the unexpected difficulties that we have had to face during the past 15 months. Ever since the great war started in August, 1914, it has been our aim to build up a reserve of all essential stores that have to be imported from England, such as cyanide, mercury, zinc, etc., and I am informed that to-day we are carrying reserves exceeding five months' requirements. With the difficulty and uncertainty of transport, the tendency has naturally been for imported stores to increase in price. So far, however, I am pleased to say the working costs on our mines have not been affected to any great extent, a result due to the greater economy that has been exercised in the consumption of material; an economy which I trust will be continued after the war is over and from which we will then materially benefit.

Relations with Employes.

I am glad to say that there has been no sign of friction in the relations with our employes on the mines during the past 12 months, a state of affairs which I sincerely hope will continue. The industry pays good wages, I believe the best in the world, and all we ask for in return is that each man should give us an honest day's work. It was recently represented to us that the slightly increased cost of living was bearing somewhat hardly on the unskilled white employes, who were not in receipt of the regular artisan's pay. I am pleased to learn that this matter has now been satisfactorily adjusted. We have now under consideration schemes for the improvement of the residental quarters on our mines and the provision of more workmen's cottages. Another, and I think a most important scheme which is now receiving the attention of the industry is to grant all employes, both underground and on the surface, a suitable period of annual leave on full pay. These improvements I am convinced are absolutely essential for the comfort and welfare of our employes, and I trust to see them in operation at an early date.

Miners' Phthisis.

I have made it my duty during my stay here to go closely into the all-important question of miners' phthisis. It is a source of satisfaction to find that not only by the mines of our own group, but by the industry as a whole, a good deal of solid work has been done. Fans have been installed on all the mines of the group where such were necessary, and considerable development work has also been done to provide ducts for the upcast air, in order that the travelling shafts and stations may be free from smoke at all times. Money has been freely spent, and whatever further expenditure may be called for in this connection will be sanctioned by the boards of my companies without the slightest demur. If this were all that was necessary we could congratulate ourselves on an easy way out of the difficulty. Unfortunately, however, the matter does not end there; for, while the expenditure of large sums of money is necessary, more particularly in the deeper mines, such expenditure is largely inadequate unless it is supported by the whold-hearted efforts of every official and workman underground. This is the great difficulty, and it can only be met by constant effort and never-ceasing vigilance on the part of everyone concerned. The Government inspectors are doing all they can in this matter, but the number of mine officials is many times more than the number of inspectors, and it is to our own employes that we must chiefly look for assistance in overcoming this scourge. I know how anxious managers, mine captains, and shift bosses are to keep their tonnage up and costs down, and rightly so, but I wish to say here that this should not, and must not, be done to the neglect of the conditions governing men's health. It occurs to me that perhaps some sort of dust record could be kept for all our officials, and that steps should be taken to see that the regulations are strictly enforced, and that any offender, whether an official or workman, should be severely dealt with. The question is too big and too vital to be played with, and calls for a strong and bold policy, both on the part of the Government and on the part of the industry.

Diamond Shares.

As regards the diamond mining industry, in which we are largely interested, I have already informed you that we have had to face a very serious depreciation in the value of our shareholdings. The action of those responsible for the conduct of the diamond mining industry in closing down the mines and ceasing production has been the subject of some very severe criticism, more especially in letters which have appeared in the Colonial Press. I think it is to be regretted, gentlemen, that our critics did not take the trouble to acquaint themselves more fully with the facts before expressing their opinions. The directors of the diamond mining companies are, after all, only the trustees for the shareholders' money, and their first duty is to discharge that trust. With the outbreak of war it was, of course, evident that the demand for such a luxury as diamonds would practically cease, and the directors of the diamond mining companies were not justified in exhausting their resources by misemploying the shareholders' money in producing an article for which there was no demand. I can assure you, gentlemen, that the step of ceasing production was only taken after the most careful consideration of the position. Personally speaking, I can assure you that nobody would be more pleased than I to see the diamond mines working again at the utmost of their capacity. A great deal has been made of the argument that if we work the gold mines we can work the diamond mines. This argument is really too futile to be considered seriously. Gold is a national necessity, whereas diamonds are an article of luxury.

Having discussed the general position with the directors of the Premier Company, it is my intention within the next few days to visit Jagersfontein and Kimberley in order to confer with my colleagues on the boards of the companies concerned, with a view to restarting operations at an early date, a step which, I am sure, would be welcomed by the whole country. You will readily understand that these operations must, of necessity, be on a much smaller scale than those carried on before the war, because the demand for diamonds at present is a limited one, and the price thereof can only be maintained by not producing and placing upon the market more than it can absorb. Any other policy must lead to disaster, and undo the good work of the last 25 years. I may remind you that with the outbreak of the war, and for many months thereafter, the demand for diamonds had quite ceased. It was entirely due to the action of the large producers who agreed only to satisfy the actual demand, that a crisis was averted, and confidence in the trade preserved. It should also be borne in mind that the maintenance of prices means the prolongation of the life of the mines with benefit both to the shareholders and the State. Naturally, in a matter of such importance as the resumption of operations, the producers are anxious to have the concurrence and support of the Government, and I have every reason to believe the Government will welcome the opportunity of employment for men now unemployed which will be afforded if my proposals are carried out. (Hear, hear.)

The Industry and the War.

We have no reason to be ashamed of the part which our mining industry has taken in contributing to the successful prosecution of the war. In addition to the extra taxation which the mines have been called upon to bear, we have granted every facility to all such men as we could possibly spare who wished to enlist for active service or the no less important duty of assisting in the production of munitions. We were recently told by Mr. Lloyd George that "silver bullets" are essential to our success in this great European war, and we have made every endeavour, and I venture to say successfully, towards this end by endeavouring to ensure and, if possible, to increase the gold supply of our Empire. This, gentlemen, is a great national duty, and as the Chairman at our last annual meeting informed you, we have, in spite of all difficulties, done our utmost to discharge this duty, and I would here like to take the opportunity of thanking those responsible for carrying on the gold industry, from the highest to the lowest, for the magnificent success that has attended their efforts. I must also again remind you of the great and valuable assistance we have received in this connection from the Imperial and the Union Governments, and perhaps more especially, though not so well known, from the British Navy. (Applause.) I will leave it to you, gentlemen, to try to realise what it would have meant, and would mean, not only to Johannesburg, but to the Union of South Africa and the British Empire, had we been compelled to close down the gold mines either from lack of supplies necessary for the production or the means of placing our output at the disposal of the Home authorities. The Chairman, in his speech last year, in referring to the European war, warned you that, although heavy sacrifies had been made, still heavier sacrifices might have to be faced. Gentlemen, it is impossible for me to forecast the future, but should it be so, I am sure we can all be safely relied upon to make such sacrifices in the true Imperial spirit. (Applause.)

General Botha.

There is still one more subject to which I must refer. As you are aware, we, as a corporation ,take no part in politics, but I trust you will forgive me if, before I sit down, I express my admiration of the magnificent manner in which General Botha conducted the South-West African campaign, and add my small meed of congratulation to him on the important piece of South Africa that he has added to the British Empire, and which I trust will some day form an outlet for your resources. I would also, if I may, beg to point out that our first and foremost and most paramount duty at the present time is to devotedly and whole-heartedly support the Government of the Union of South Africa in their action against the enemies of the Empire. (Applause.)

Appreciation of Directors and Staff.

Before closing my remarks I must make some acknowledgment of the services rendered to the company by my co-directors, both here and in London. As I have already stated, during the troublous times through which we have passed and have still to face, their responsibilities are very great, and a constant source of anxiety requiring their unremitting attention. To the officials and staff of the company, both in Johannesburg and London, I would here wish, on behalf of the board of directors and myself, to convey our appreciation of their loyal services. Our staff is so large that it is impossible to refer to them individually, but it is a very great pleasure to me, on revisiting Johannesburg, to recognise the faces of so many of the older members, which I cannot help thinking is a sure indication that they are satisfied in the service of the company. In referring to our officials, I would mention that our consulting engineer, Professor J. G. Lawn, had lately, for purely domestic reasons, to take up his residence in England, but I am glad to say that his services are still retained by the company in London as consulting engineer, and that he will pay occasional visits to South Africa as circumstances may require. Mr. W. L. White has recently been appointed consulting engineer, and I am sure we can rely on him to do his utmost in the company's interests. I would here mention that, at the request of the authorities (and with the acquiescence of your board), the services of Professor Lawn and our London manager, Mr. W. J. Benson, have been temporarily placed at the disposal of the Home Government.

Gentlemen, you have of late been inflicted with such floods of oratory from other sources that I really feel I must apologise for speaking at such length. I have, however, endeavoured to condense my remarks within the smallest compass that the magnitude and variety of your interests allow. Gentlemen, I now beg to move that the report and accounts, as submitted, be adopted. (Prolonged applause.)

MR. IMROTH'S SPEECH.

Mr. Gustav Imroth said : Gentlemen,—In rising to second the resolution before the meeting, I must first of all express my pleasure, in which I am sure you all join, that our permanent chairman, Mr. S. B. Joel, has found it possible to come out to South Africa to preside at our meeting to-day. With such vast interests to control we cannot expect him to pay us an annual visit, but I sincerely trust that circumstances will permit him to come to us at more frequent intervals. I almost feel that his stay with us has so refreshed his taste for South African surroundings that we may reasonably hope to see him here more often. I can assure you, gentlemen, that though absent in body, we, who are entrusted with the administration of affairs on this side, know that he keeps in close touch with, and follows with the keenest interest all the details of our business. I wish to thank him for his kindly references to the directors, officials and staff, and desire to assure him that it is a source of much satisfaction to my colleagues on the board and myself that he found the company's affairs, both financial and mining, in a state that enabled him to place so satisfactory a statement before you. His exhaustive resume of the position of affairs leaves little for me to add, but there is one point in his speech to which, with your permission, I should like to refer. He has told us that at present the gold and diamond mining industries are the main pivots round which the welfare of South Africa moves. Gentlemen, we all know this is perfectly true, but to my way of thinking, the fact is also regrettable. You are aware that this company has other assets than shares in gold and diamond mines, and these assets, consisting as they do largely of estate property, give our company a more permanent and assured future than many other Rand companies can look forward to. Our holdings in estate property give us a deep interest in whatever affects the general prosperity and development of South Africa, and especially of the Transvaal, Johannesburg, and its neighbourhood.

Now, I am inclined to think that we who are entrusted with the direction and maintenance of the output of this great gold industry are apt to consider it too exclusively ,and to forget that a great Union such as South Africa cannot always live on the mining industry alone. We must broaden the bases of our production. A visit to other parts of South Africa leads one to suspect that a great section of our population can never draw its means of livelihood from the mines, as we on the spot are apt to imagine, and sometimes we may injure our own outlook and prospects by overlooking this fact. We all know that the mines are of immense value to this country ; we need only look at the trade figures to realise that; but there are other sources of production than gold and diamonds. A big company like ours, which is so interested in the permanent prosperity of the towns of the Transvaal, must not become so centralised as to overlook the fact that the prosperity of a country is built up of many things, and depends on many producers. I would remind you in this connection that during the last two or three Sessions of the Union Legislature, the affairs of the mining industry have been very prominent in the discussions. This prominence has given me at times the uncomfortable feeling that better all round conditions in South Africa would make us less prominent, and that all of us would be gainers by the change. It would be better for the country in the long run, and better in particular for companies possessing many interests such as yours, if the mines had competitors for the attention of Parliament. If this happened, I should feel that other interests were beginning to grow, and would help to support the economic burdens of the country.

Resources Waiting Development.

We want in fact to hear more frequently of the great undeveloped natural resources of the country. I feel inclined to compare the attitude of a large section of the population of the Union towards our industry to many a young man with a rich father who foolishly said, "Why trouble? I have a wealthy father who will provide for me."

Your chairman, in his speech, made reference to the South African Breweries, in which we are largely interested. Here alone, in the growing of barley and hops, the seeds and plants for which are freely distributed by the brewery, a large field of employment is opened up. In the Cape District, for instance, where I have recently been on a visit, the agricultural possibilities such as fruit growing, wheat farming, etc., are immense, and should in time absorb the energies of a large population. There are already the beginnings in the Cape of small industries, which would further employ the people and create wealth. What we must try to do is to increase the taxable commodities of the country by the creation of other sources of wealth. It is essential that each section of the Empire should turn its attention to these matters. We cannot look to Great Britain for loans, but must bear our own burdens and adjust our own problems of revenue and expenditure. I am sure you will see that if the mines are the only horse in the cart they will have to do all the pulling. therefore I say, let us look round and see if we can find and encourage the development of those other sources of wealth on which other civilised countries which have neither gold nor diamonds rely for the support of their population, and as we see in the case of Great Britain, are thereby enabled to sustain most astonishing financial burdens. I have much pleasure in seconding the adoption of the report and accounts as submitted.

The Chairman invited questions, and there being no response he put the motion, which was carried unanimously.

The retiring directors—Sir John S. Purcell, Messrs. J. Emrys Evans, J. Friedlander, and Isaac Lewis—were reelected on the motion of the chairman.

The Johannesburg auditors, Messrs. J. P. O'Reilly and Henry Hains, and the London auditors, Messrs. Chatteris, Nichols and Co., were reappointed, on the motion of Mr. Aburrow.

VOTE TO THE CHAIR.

Mr. Dale Lace said he rose with much pleasure to propose a very hearty vote of thanks to the chairman, not only for his very welcome presence, but for the very able, concise, and comprehensive manner in which he had presented the affairs of this great corporation. A great corporation it had been in the past; it was greater to-day, and he hoped it would be still greater in the future. (Hear, hear.) They could do with many such great corporations, so ably conducted as this has been in the past and as has had been evidenced from the chairman's address. This corporation had ever been first in the affairs of the town, in the advancement of matters commercial, mining and financial. Its enterprise had not always met with that mead of success which they had hoped for but its work had always been directed in the best interests of the people and the industry. They all knew how very heartily the chairman had been welcomed by the people, and it was to be regretted he could not come here more often. They hoped that in the future in spite of the many calls made upon him he would visit them more frequently. (Hear, hear.) Mr. Joel certainly believed in himself and optimism such as he had expressed must permeate throughout the world. He believed in himself, and in those around him; he had confidence in the country, in the industry, in the place, and in the future. That confidence he had shown in a very large manner, in fact in every way.

He had the greatest possible pleasure in moving a hearty vote of thanks to "Solly," he could not think of him as Mr. Joel. He looked upon him as one of themselves. The same old Jolly Solly. (Laughter.) If it were possible they would like him to be always with them, because they were certain he was happier here than anywhere else. (Laughter.)

The Chairman, in acknowledging the vote of thanks, said that he and the other directors appreciated it very much indeed. As he had already said, it was 10 years since he was last here, and he could assure them that in the future he would try to come more often. (Applause.) As Mr. Lace had said, the best years of his life had been spent in South Africa, and there was no country which he enjoyed more. He regretted that circumstances over which he had no control necessitated his permanently residing in England. But whenever the opportunity arose he would revisit South Africa. He thanked them very much on behalf of himself and the directors for the vote of thanks. (Applause.)

The meeting then concluded.

ROBINSON DEEP, LIMITED.

NEW COMPANY SCHEME.

PROVISIONAL AGREEMENT CARRIED.

OPPOSITION TO PROPOSAL.

A special general meeting of shareholders of the Robinson Deep Gold Mining Company was held on Nov. 11th, in the board-room, Consolidated Gold Fields Buildings for the purpose of considering the adoption of a certain provisional agreement dated the 7th of September, 1915, entered into between the Robinson Deep Company, Booysens, Estate, Ltd., South Deeps, Ltd., the owners of the freehold of portions of the farm Booysens No. 20, the Consolidated Gold Fields of South Africa, Ltd., the Central Mining and Investment Corporation, Ltd., and Charles A. Wentzel, as trustee of the new company to be formed.

Mr. D. Christopherson presided, and there were also present Messrs. F. Leslie Brown, C. Hely-Hutchinson, W. S. Smits, J. E. Kent, D. W. Rossiter, W. Sangster, R. des Clayes, A. S. Ball, H. H. Oldroyd, R. O. Stone, F. M. Cowan, T. Connolly, W. T. Birch, A. C. Burrill, A. Hyman, E. M. Hyman, J. M. Williams, E. R. Grant, J. Brown, J. Wevell, R. Kirby and J. R .Nicholson, with Mr. G. C. White (secretary), and Messrs. C. D. Leslie, Craig, Low, Diamond, Honnett, Webber and C. A. Wentzel in attendance. There were represented personally and by proxy 510,653 shares out of an issued capital of 1,000,000 shares.

Chairman's Speech.

The Chairman entered into a lengthy explanation of the scheme. He said:—This meeting has been called to consider, and if deemed fit, to adopt with or without modification a provisional agreement entered into between this company, Booysens Estate, Ltd., South Deeps, Ltd., owners of the freehold portions of Booysens Farm No. 20, the Consolidated Gold Fields of South Africa, Ltd., the Central Mining and Investment Corporation, Ltd., and Mr. C. A. Wentzel as trustee for a new company proposed to be formed. The principal provisions of the agreement were incorporated in the notice calling the meeting and fuller explanatory notes were given in a circular which was issued to shareholders at the same time as the notices of meetings were posted. I propose before formally moving the various resolutions to deal more fully with the agreements and explain in detail certain points which some shareholders have asked should be dealt with and made more clear. After the resolutions have been proposed and seconded, shareholders present will have an opportunity of expressing their views and asking any questions.

Long Negotiations.

The directors have for some years past endeavoured to arrive at an agreement with the Booysens Estate and South Deeps companies, with a view to secure a longer life for this company. Shareholders have from time to time been informed that such negotiations were on. At the annual shareholders' meeting held on the 22nd June, 1914, I stated from the chair that with regret it had to be reported that these negotiations had failed, and at that meeting shareholders expressed the hope that negotiations would be reopened. I think I may explain at this point that when negotiations were first opened several years ago it was difficult to agree on an estimate as to what returns might be expected from Robinson Deep and when this difficulty had been removed, owing to the mine having in the meanwhile become practically developed, there still remained the question of the valuation of the undeveloped areas belonging to the Booysens and South Deeps companies. Varying deductions can be made from values found in neighbouring properties, and a conflict of opinion as to these deductions can be well understood as likely to occur, both sides being able to use arguments difficult to refute. Hence a scheme had to be evolved based upon the more easily ascertained value of Robinson Deep, under which the Robinson Deep shareholders' position was made secure, and with as little risk as possible, and at the same time some elasticity given so that they should benefit if the more optimistic views of the values to be expected in Booysens and South Deeps proved correct. Under these circumstances the first step to be taken was to make as close an estimate as possible as to what profits could be made and distributed if Robinson Deep continued to work out its life to a finish, and, for the reason stated above, this was not such a difficult matter. A French shareholder wrote to me, and asked whether the Robinson Deep life had not been under-estimated, in view of what had happened on other properties, where the life had been extended very much more than was expected. Gentlemen, there are good and sufficient reasons to advance why this cannot be so, to which I shall refer at greater length later on.

Interests of Shareholders.

Under the proposals now placed before you, Robinson Deep shareholders can afford to find values in Booysens Estate and South Deeps falling off considerably as compared with values in Robinson Deep before their position is endangered. The cumulative preferent rights which are secured to them will, as I shall show later on, give them returns considerably in excess of what they could hope to obtain by themselves, and, short of some catastrophe happening or of the Booysens ground turning out practically valueless, an event so extremely unlikely as to be scarcely worth considering, there is nothing that can stand in the way of their realisation; and at the same time they are given the opportunity of participating in any benefits that may accrue in the event of the Booysens and South Deeps ground turning out really well. Your directors had, therefore, no hesitation in submitting the scheme for your approval.

The Main Points.

The notice calling the meeting gives you the main points of the agreement you are asked to confirm, and the circular issued at the same time gives fuller information. The main points are:—

1. The agreements are to take effect from July 1.

2. A new company to be registered, called the "Robinson Deep, Limited," with a capital of 500,000 cumulative preference shares of 1s. each ("A" shares); 900,000 shares of £1 each ("B" shares); for the purpose of acquiring: (a) The assets of the Robinson Deep Gold Mining Company, Ltd.; (b) the claim and mynpacht holdings of Booysens Estate, equal to a claim area of 224.974 claims; (c) the claim and mynpacht holdings of South Deeps, Ltd., equal to a claim area of 117.273 claims; (d) the rights of the owners of Booysens freehold, in extent approximately 300 morgen

3. That the capital be allocated as follows:—The Robinson Deep Gold Mining Company, 500,000 1s. cumulative preference shares ("A" shares); Booysens Estate, 441,000 ordinary (B) shares; South Deeps, 225,000 ordinary (B) shares; owners of Booysens freehold, 15,800 (B) shares; reserve shares, 218,200 ordinary (B) shares. The "A" shares will be entitled to cumulative preference dividends as follows: From July 1, 1915, to December 31, 1919, for 4½ years, 8s. per share, which is equivalent to a return of 20 per cent. per annum on the present capital of 1,000,000 shares; from January 1, 1910, to December 31, 1936 (i.e., 17 years), 3s. per share, equivalent to 7½ per cent. per annum on the present capital; for the year ending December 31, 1937, 2s. 6d., equivalent to 6¼ per cent. per annum on the present capital; for the year ending December 31, 1938, 1s. 6d., equivalent to 3¾ per cent. per annum on the present capital; for the year ending December 31, 1939, 1s. 6d., equivalent to 3¾ per cent. per annum on the present capital; for the year ending December 31, 1940, 6d., equivalent to 1¼ per cent. per annum on the present capital. Thereafter the face value is to be repaid and the shares extinguished. The holders of "A" shares are protected in case of prior liquidation, as in that event they will hold preferential rights (in addition to the return of their nominal capital and (or) of any dividends in arrear) to the capitalised value of all dividends still outstanding on the basis of 6 per cent. and 3½ per cent. Lastly, the holders of "A" shares are given the opportunity of exchanging half their holding for "B" shares in December, 1919.

Detailed Explanation.

I will now go into more detail and make some explanatory remarks on the above. The reason the agreements take effect from July 1 is simply on account of convenience. Should the scheme be approved, and the resolutions passed, it is proposed to incorporate the new company on December 31, 1915, so that the dividend for the period July 1 to the date of the incorporation of the new company will correspond wth the half-year ending December 31. An even 10 per cent. dividend will, therefore, be paid for that period.

It was desirable to form a new company in order to simplify the carrying out of the provision in the agreement whereby the A shares can eventually be extinguished.

According to what I have just read as the main points of the agreement, the Robinson Deep shareholders are to receive 500,000 cumulative preference shares of a nominal value of 1s. each. Although the nominal value of the share is reduced to a shilling, the share is actually worth more than the value of the two equivalent present Robinson Deep shares, as the cumulative preferential dividend secures to that 1s. share a greater return in dividends than it is estimated would be the case if Robinson Deep worked out its own life, and the excess return so secured is considerably over what could possibly be hoped for from realisation of the assets left after your mine had been exhausted. As I have previously intimated, there is very little difficulty in making a fairly close approximation of the remaining tonnage and profit to be expected from your mine. As from the 1st of March, 1915, the remaining tonnage was estimated at 4,680,000 tons of a value of 6.3dwts. mill grade. In this tonnage is included about 1,000,000 tons of reclamation rock, which would be worked in with the higher grade rock from stopes, and, to some extent, after the stopes have been worked out. From the total tonnage, as you will see from the circular, it is estimated a profit of £1,470,000 would be made and distributed over a period of eight and a half years.

Mining Tonnage.

The only point in this estimate about which there may perhaps be a division of opinion is whether it would be possible to mine all of this tonnage in that period. Mining work is already becoming more or less confined to the south-western section of the mine, owing to the exhaustion of the eastern section. If the monthly tonnage allowed for in the estimate of profits over the eight and a half years is not maintained, the profits will not only be deferred over a longer period, but working costs would be higher and the estimated profit reduced. Under the proposition now before you the danger of the returns in the near future being not so good as estimated owing to difficulties of maintaining the tonnage is reduced, as faces in Booysens ground can be made available for attack within a few months. The question of maintenance of tonnage will then be mostly one of sufficiency of native labour supply, and if there is an insufficiency, the Robisnon Deep, if working on its own, would also feel that insufficiency. Permit me to put very shortly another aspect of the position of a Robinson Deep shareholder if the agreement before you is approved.

Over eight and a half years, if the property was worked on its own account, he would receive 29s. 5d. per share in dividends. At the expiration of such period the company would hold its remaining assets, consisting of such cash it may have on hand, gold on plates, shafts, machinery and plant. It is impossible to foresee what cash the company might have in hand at the end of its life. As there would be no reason for maintaining any reserves at such a time it may be presumed that there would be very little which had not been distributed in dividends. The value of the gold in the plant would largely depend on how close the clean-ups had been made to maintain profits during the last few months. The value of the plant, and machinery and equipment would be practically negligible. It must not be thought that Booysens Estate and South Deeps must eventually purchase Robinson Deep plant and equipment, as, supposing those companies decided to work the properties themselves there are other plants and equipment, including accommodation for whites and natives, in the immediate neighbourhood which would be in the market for sale; and also, it is more than possible, those companies might never require plant and equipment, etc., as they would be able to dispose of the ground on favourable terms to their neighbours on the east and west, especially if a shaft was sunk and some development work carried [illegible]. Thus, what the holder of the present Robinson Deep shares would realise at the end of the life of the mine from the assets left is a matter of extreme doubt.

Position of Shareholders.

Now for the position of the Robinson Deep shareholder under the new proposals. He will receive cumulative preference shares of a nominal value of 1s. From the dividends on these shares he will receive in 12½ years the same amount (equivalent to 29s. 5d. on each share in the present company) as he would have received in eight and a half years—but he is much more certain of getting this full return. After having received this, instead of being in doubt and disappointment as to what he may receive from the assets left after the mine has been worked out, he knows (providing he does not exchange half his holding for B shares) he will get returns over a further period of 13 years equivalent to 17s. per share in the present company. This further 17s. per share means a distribution of £850,000, the discounted value of which 12½ years hence, after allowing for the loss he suffers in getting the original 29s. 5d. per share over 12½ years instead of eight and a half years, amounts to £550,000, which may be taken as the sum that Robinson Deep is getting for what may be realised after the eight and a half years (if worked on its own) from the remaining assets. Gentlemen, those returns are such that I have no hesitation in asserting that the holder of Robinson Deep shares would have no hone of realising if the mine worked out its own life.

I will now take the position of the Robinson Deep shareholder if he decides to exchange half his holding of A shares during December, 1919. Under these circumstances, during the four and a half years from 1st July, 1915, he will receive the full preference dividend for four and a half years on his preference shares, i.e., 36s. per share (equivalent to 18s. per share in the present company). After exchanging he will receive on his preference shares a further return of 58s. per share (equivalent to 14s. 6d. per share in the present company) but, in addition, he will hold a number of B shares, equal to the number of preference shares he still holds, the value of which depends entirely upon the values opened up in Booysens and

South Deeps. The B share may prove not to be worth 15s., or they may prove to be worth 50s. a share, or even more—it is impossible to say; but before the A shareholder need exchange he has the very important advantage of knowing what values have been opened up in Booysens from development work during the next four years from December next. As regards the value of this right to exchange, I might here mention that an agreement has been entered into with Turffontein Estates, Limited, whereby the new company after the proclamation of that farm will purchase the whole of that company's assets (including the freehold and mineral rights) for a consideration not exceeding 118,000 £1 B shares, which shares will come out of the reserve shares of the new company. This will again extend the life of the new company by a large number of years, and may materially affect the value of this right to exchange.

Payment of Dividends.

You will have noticed that the Consolidated Gold Fields of South Africa, Limited, and the Central Mining and Investment Corporation, Ltd., have agreed to lend the new company during the first seven years of its existence such sums as it may require up to a maximum of £300,000. This arrangement still further secures the regular payment of the preference dividends during the period when large sums will have to be spent by the new company in connection with the new shaft to be sunk on Booysens ground and other necessary new equipment. It also ensures that the new company will be able to get ahead with development in order that profits may not be adversely affected in the future owing to the shortage of stope faces. In return for this guarantee these corporations have an option over 100,000 of the reserve shares at par of the new company for a period corresponding with the period of the guarantee.

I would now, gentlemen, like to refer to the cash which the new company will have available for capital expenditure, from the cash which it will receive from the Robinson Deep. The agreement provides that the new company takes over all the assets and liabilities as at the 30th of June, 1915. Thus the new company has to accept the position of the Robinson Deep as at the date of the incorporation of the new company, which I have previously stated is proposed to be at the 31st of December. At that date, after providing for all liabilities, including the payment of the 10 per cent. dividend to A shares for the current half year, it is estimated that the company will hand over about £114,000. Of this sum: (a) £65,000 in cash which has been ear-marked against the balance of the liability at present amounting to £145,000 still due to the Government for the purchase of the water-right claims.

As you were informed at the annual meeting in 1912. We have been setting aside monies each month to establish a fund which would tend to relieve profits of the burden of having to provide for the payment of these annuities after the waterright areas were exhausted when we would have to depend for our profits on the lower grade tonnage remaining. The new company will, however, be able to make use of these monies at once as, owing to its longer life and facilities for working to which I have referred, it can rely on being able to pay the annuities out of current profits. The new company can expect to draw little if any more rock from these water-right areas, and for all practical purposes they are already exhausted. The difference between the £145,000 which still remains to be paid and the £65,000 which has been provided by your company against this payment, i.e., some £80,000 will have to be provided by the new company, though the new company will reap practically no benefit whatsoever from the waterright area dams; (b) £36,000 standing to the credit of renewals fund. The present company might or might not have used up this money on expenditure on renewals during its life. If further serious trouble occurred in No. 2 vertical or incline shafts, the possibility of which has constantly been mentioned to shareholders, then probably this money would have been required.

Other Investments.

In addition, there will be the following investments which to-day are valued at £14,176: 1,254 Witwatersrand Native Labour Association, Limited, shares of £1 each (12s. paid); 1,533 Witwatersrand Co-operative Smelting Works, Ltd., shares of £1 each (8s. paid); 53 Native Recruiting Corporation, Ltd., shares of £1 each, fully paid, and deposit of 7s. 6d. each on the total complement of 5,165 natives, being part of total liability under agreement of £1 per share; 9,050 Breyten Collieries, Ltd., shares of £1 each, fully paid.

This will constiute the cash which the new company will take over, which will be available for capital expenditure.

Before proceeding to deal with certain points on which some shareholders have asked further information. I would like to refer to a statement I made earlier in my speech, namely, that so far as the proposed new company is concerned, the maintenance of the number of tons crushed will be largely a question of having a sufficiency of native labour. There is an important reservation to make, and that is the possibility of further trouble on account of moving ground in No. 2 shaft. I in no way wish to exaggerate the danger of this possibility, but I am in duty bound to tell you that during the last few weeks there have been indications that the work we have already done to strengthen the positon here has not by any means eliminated this danger. If the worst happened and a portion of this shaft was lost for a time, it would seriously interfere with the tonnage and profits of the Robinson Deep if working on its own. Under the proposals now before you, further security is offered that in such event your dividends will be paid, and the guarantee for an advance up to £300,000 for capital expenditure becomes all the more valuable.

Reply to Shareholders.

I will now deal with one or two points which various shareholders have raised and have been good enough to come and discuss with me.

First.—That the proposal eliminates all speculative value from the Robinson Deep share.

Now, gentlemen, a shareholder with a considerable holding, when he heard that negotiations were on with Booysens, informed Gold Fields that he was strenuously opposed to any amalgamation unless he was satisfied that his returns were secure. He stated that he held these shares as an investment and looked for his returns from the mine. He wanted no speculative possibilities. Another shareholder expressed a similar opinion to me. He stated that he was in bad health and depended on his dividends, and wanted no "chances." This goes to show that there are two classes of shareholders to satisfy. The shareholder who looks on his shareholding as an investment, and the one who holds his share for its speculative value.

Gentlemen, I claim that both sections under this scheme have been met, the investor is better secured for his dividends, whilst the speculator has a bigger run for his money than otherwise.

Other shareholders have suggested that our valuation of Robinson Deep may be too conservative, as it may have a longer life than estimated, and more profits. In reply to this I say the mine is practically developed and the ore contents of the unworked portion can be fairly estimated. Moreover, the engineers, in making this estimate, have been able to avail themselves of the knowledge gained from the experience of other mines, where the life has been extended beyond what was expected, so, in arriving at this estimate of an 8½ years' life, due consideration has been given in this respect. As I said before, the estimate of the tonnage of ore remaining to be mined includes nearly 1,000,000 tons of possible reclamation ground. You must remember that a very large amount of caving has occurred in worked out places which largely reduces the possibilities of extension of life, as has been the case on certain other mines. I sincerely wish one or two shareholders, who spoke to me on this point, had accepted my invitation to them to go underground and see for themselves the position. The proposition before you makes a certainty (as far as mining can be a certainty) of an extended life and better profits than could possibly be hoped for otherwise.

Some shareholders, again, consider that Booysens Estate and South Deeps are getting too much. Well, Gentlemen, those were the best terms we could get. The value of these "B" shares has yet to be proved by development, and in order to do that work and pay the dividends on the "A" shares and provide for other capital expenditure, use will have to be made of the ore contents of Booysens. The opening up of the upper levels of the Booysens ground will enable the ore still remaining within your company's boundaries to be worked much cheaper than your company could possibly manage with its mining operations practically confined to the south-west corner of the property and the consequent long tramming distances. Those companies will be largely paying for the capital expenditure out of ore coming from their own property.

A Shares Dividends.

By stipulating for cumulative preferential rights for Robinson Deep shareholders, we have secured for you, as far as possible, the regular payment of dividends on the "A" shares. I doubt the "B" shares receiving any satisfaction before 1921, certainly not if our estimates are correct. Before I leave this point I must again impress upon you that a deal with your company was not the only way open for the Booysens and South Deeps companies to dispose of their property. Your directors either had to accept the terms offered, which showed a clear advantage to Robinson Deep shareholders, or give up the idea of getting any benefit from the ground immediately south of their boundary. To delay further made the bargaining power of the Robinson Deep less, and, in view of the most recent values exposed in the lowest levels of the Village Deep—the lowest being the 18th level, which has now reached the Booysens boundary at a point about two-thirds of the depth of the Booysens-South Deeps area—the bargaining power of those companies was, if anything, liable to grow in strength. For instance, I am permitted to inform you that the last 600 feet of this drive averaged 8.3 dwts. over an assumed stoping width of 65 inches, and a stope above the drive, only 250 feet from Booysens boundary, is yielding 10 dwts. over 65 inches.

It has also been urged that the Gold Fields should allow the Robinson Deep shareholders the right to convert all their "A" shares for "B" shares in December, 1919. Your directors having secured from Booysens and South Deeps the best terms possible for the shareholders holding their shares as an investment, Gold Fields were then asked whether they could not arrange to give some speculative value to the "A" shares. Gold Fields at once met us as far as they felt justified in doing so, having regard to their own shareholders. They gave the rights to "A" shareholders to convert half their holding, with the great advantage that those "A" shareholders can watch the values opened up in Booysens for a period of four years from December next before exercising that right. By then a good deal should be known, as it is essential for development in this ground to be pressed on. If during that period development opens up well and the profits of the new company work out satisfactorily, surely it will allow as much scope for a speculative value in "A" shares as if Robinson Deep worked on its own, in which case, as I have already pointed out, there is little margin for speculation for the value of the shares to rise, and whatever margin there might be under the most favourable conditions would also be present the other way round, especially in view of further trouble occurring in No. 2 shaft.

Robinson Deep Shafts.

Another question raised was whether sufficient value had been placed on the use which will be made of the Robinson Deep shafts in working the Booysens and South Deeps ground. The questioner assumed that these shafts would always be essential to the operations of the new company. Gentlemen, this assumption is wrong. The new seven-compartment shaft, which will probably take four and a half to five years before it can be used, will serve the purpose of hauling the whole of the tonnage to be milled. Hoisting in the No. 2 shaft of Robinson Deep will be abandoned at the earliest possible moment after the completion of the new shaft, whilst the No. 1 shaft will be similarly abandoned shortly after. It is estimated that at least 1,500,000 tons from the Robinson Deep lower ground will be diverted and hoisted through the new shaft. Thus the value of these shafts to the proposed new company is limited to the use the new company is able to make of them for the first four and a half to five years whilst the new shaft is being sunk and for ventilation purposes. The latter, however, could be secured in other directions.

Lastly, a French shareholder wrote and suggested that it would have been better to postpone placing the proposals before shareholders until after the war. This was a point which received the utmost consideration. If the nature of the proposals was such that there was grave risk that the Robinson Deep shareholders' interests were being jeopardised, the position would be different. As I hope I have been able to show you, there is no question of this. It is, on the other hand, essential for the security of the regular returns to Robinson Deep shareholders and for the success of the whole proposal that development and stoping work in Booysens ground should proceed without further delay, and that the locality of the new shaft be fixed and shaft sinking commenced as soon as possible. I have personally always pressed that it was in the interest of the Robinson Deep shareholders to have this business completed before the end of the year, and never have I been more sure than I am to-day that in doing so I was acting in their interests.

Gentlemen, I have nothing further to add, but to move the resolutions, and, after they have been duly seconded, I shall be glad to hear the views of any shareholders or to answer any questions that may be asked before taking a vote. I now beg to move the first resolution.

The first resolution provided for the adoption of the provisional agreement.

A number of questions were then put, principally by Mr. Aubrey Hyman and Mr. Birch.

Mr. E. Hyman moved as an amendment that the meeting be adjourned for six months.

Replying to other questions and the discussion, the chairman gave the cash position at the 30th of June last. Mr. Hyman had asked what had the Robinson Deep been paid by the Booysens Company for proving their property This shaft was sunk by a common arrangement. They wanted to locate the Grahamstown dyke. It was mutually agreed that the Robinson Deep should sink a shaft in the Grahamstown dyke at the Booysens expense. Not only that, but the Robinson Deep were very anxious to do this themselves and had already asked for permission. No. 2 incline was sunk 800 feet into Booysens at Booysens' expense. Six hundred feet of this was necessary for the installation of a leading chute dealing with rock from the Robinson Deep 3,300 feet-3,400 feet level. Rock from ten stopes had already gonee through this chute. If this development had not been possible it would have been necessary for the Robinson Deep to sink one or two auxiliary shafts to deal with the tonnage.

Faith of Directors.

The directors believed that in the scheme submitted the Robinson Deep shareholders had secured a very satisfactory arrangement for themselves. In regard to the reference to the Turf Mines made by Mr. Birch, Mr. Christopherson replied that the price worked out at £2,087 per claim, which was practically th price Booysens and South Deeps were being now paid for their claims. As regards an inquiry about the development at Booysens he replied that the development was 72,900 milled tons at 7dwts. In respect to the liability of £27,000 of Booysens and South Deeps, he pointed out that the scheme provided for no liability. That liability did not fall on the company at all. The fundamental difference between the directors and Mr. Hyman was that Mr. extended life beyond the period originally contemplated. They had taken that into consideration in making their calculations. In a case like the Robinson Deep the position was totally different to a great many other mines. Personally, he was prepared to accept their calculations. Mr. Hyman had said that the shareholders were getting nothing for their machinery, plant and equipment. He could not agree with that. As far as he could see they were getting an extra distribution. of £850,000 or £870,000. The shafts would be of value for the first five years, but after that, when the new seven-compartment shaft was ready, the position would be very different. No doubt they would be of some value as regards ventilation. He would like to correct Mr. Hyman and say that everything could be worked out in three and a half years. Mr. Leslie would correct him if he was wrong.

Mr. Leslie: It is impossible to work out the mine in that time.

The Chairman also corrected Mr. Birch in regard to the fall in the value of the shares. From August 7 to August 21 the middle price was £1 1s. 3d., on August 28 £1 1s. 2d., and on September 3rd £1 2s. 6d.

Another shareholder asked whether the vendors were the authors of "this scientific manipulation," referring to the scheme.

The Chairman: Yes, all the vendors. Otherwise we cou'd not have come to this agreement.

The Chairman said finally, in reply to Mr. Birch's remark that it was unseemly for them to be discussing pounds, shillings and pence while shareholders were fighting in Europe: "I feel this as much as you, but I believe I am serving their interests."

The amendment was defeated on a show of hands, and the resolution, with the others which followed as a matter of course, were then carried.

Cables:
"McKECHNIE, WIDNES."

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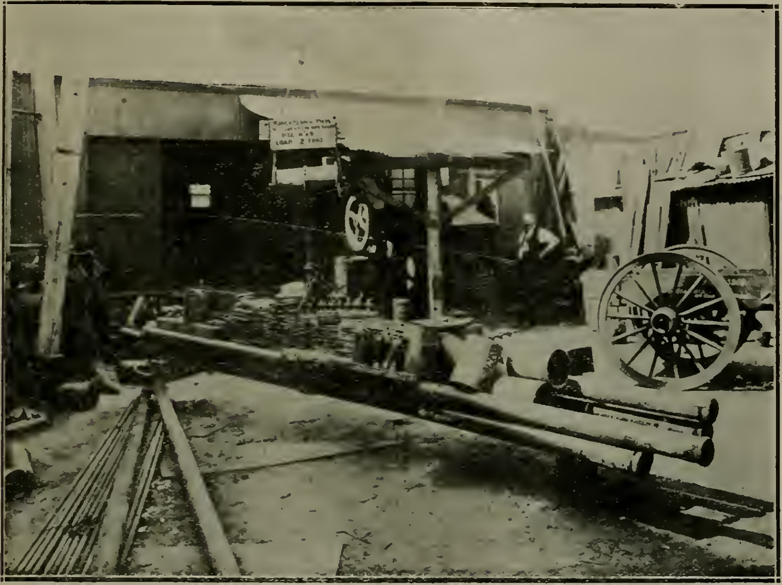
Engineering Notes and News.

Interesting Test of New Shaft Roller.

The photo below shows a test of an 18 in. by 9 in. R. & M. shaft roller; a load of two tons being supported by it, while it can yet revolve freely. Prior to this load being applied, it had been supported as obtains in normal use, and had been subjected to misuse by a brawny Kaffir armed with a 28 lb. flogging hammer. The result of this treatment was to dent the shell severely in many places, without, however, in any way binding the roller on its bearing, as no difference whatever in the ease of rotation could be noticed. Tests such as these show that the type of roller under notice is amply strong enough to resist the worst shocks it may be subjected to in actual working. Messrs. Robertson & Moss, of Trust Buildings, are to be congratulated on the successful way in which their product has justified their faith therein; as many firms would have hesitated to apply such a severe trial in public.



INTERNATIONAL ENGINEERING CONGRESS.

The International Engineering Congress for 1915 was held on September 20th to 25th, at San Francisco. A programme of Papers of unusual dimensions was got through, no fewer than 250 being presented, the reading of which was distributed among 54 sectional sessions. The location of the Congress was near to the Panama-Pacific International Exposition, and as the proceedings were opened with an address by Major-General George W. Goethals (Chief Engineer of the Isthmian Canal Commission and former Governor of the Canal Zone), it might be regarded as joining with the Exposition in celebration of the completion of the Panama Canal. A brief account of some of the Papers presented is appended, based upon a report in "The Iron Age":

Forgings.—In a Paper by Mr. C. von Philip, manager of the machinery department of the Bethlehem Steel Company, and read in his absence by Professor W. R. Eckart, jun., Professor of Mechanical Engineering at the Leland Stanford Junior University, the author dealt with the subject of "Forgings from Early Times until the Present," and covered briefly the production of forgings by hammering, pressing and squeezing, extrusion, die-casting, and bending. A further paper was submitted by Mr. A. J. Capron, of Sheffield, on the "Recent Progress and Present Status of the Art of Forging with Special Reference to the use of Quick-acting Forging Presses," in which besides discussing the forging process in a general way, the author took up the questions of forging tyres, wheels, axles, and shells (the last rather briefly), and in conclusion expressed his belief that forging presses of all powers, and particularly of medium and small powers, will undoubtedly come into more extensive use in the near future.

Machine Shop Practice.—Two Papers on machine shop equipment, methods and processes were presented, one by Mr. E. R. Norris, director of manufacturing operations of the Westinghouse Electric and Manufacturing Company, Pittsburgh, and the other by Mr. H. F. L. Orcutt, managing director of the Gear Grinding Company, Limited, Handsworth, Birmingham (England). Mr. Orcutt outlined the important improvements of machine-tool design, discussed the advances made, particularly in grinding machines, in gear-cutting and tooth-finishing machines and in automatic chucking machines, and argued that small concerns, which may not be able to support with profit their own scientific staff, can make use of the numerous central laboratories to collect the best material. He discussed the limit gauge system and also the question of scientific management in machine-shop work.

High Temperature in Metal Working.—A Paper entitled "High-Temperature Flames in Metal Working," by Mr. H. R. Swartley, jun., was devoted in part to oxy-acetylene welding and cutting and the use of thermit. In the discussion ,Mr. Doble noted that electric processes of welding were not considered in the Paper, though he considered the electric method better for pipe-line welding than the processes described by the author. He referred to a 42-in. pipe-line at Boulder, Col., which leaked at every joint, and while it was repaired by the oxy-acetylene process, it would have been better, he contended, to use electric welding, as electric current was readily available. He mentioned a case of a Y-casting which had been in service eighteen months after a crack from shrinkage strains had been welded electrically. In the Pelton works such castings were now, he said, deliberately cracked to remove shrinkage strains, and after annealing the crack was electrically welded.

Iron and Steel Papers.—A symposium of Papers on Iron and steel, edited by Dr. Henry M. Howe, was presented. The first was on "Iron and Steel Castings," by Mr. John Howe Hall, Metallurgical Engineer to the Taylor-Wharton Iron and Steel Company. It was discussed by Mr. J. W. Beekman, who objected to the expression "semi-steel," partly on the ground that steel men used it to mislead.

Further Papers were "Metallography and the Hardening of Steel," by Professor Albert Sauveur, Harvard University: "Case-Hardening of Steel," by Professor F. Giolitti, Turin; "The Duplex Process of Steel Manufacture," by Mr. F. F. Lines, Maryland Steel Company. Professor Richards, in discussing the last, gave it as his opinion that before long steel will be commercially produced quite largely by properly combining the use of the Bessemer converter, the open-hearth furnace and the electric furnace, the first to get up the temperature of the metal quickly, the second to maintain it and the electric furnace to finish the process.

"Methods of Preventing Piping in Steel Ingots," by Mr. Emil Gathmann, Baltimore, and "Steel Alloys," by Mr. G. L. Norris, American Vanadium Company, Pittsburgh, were the titles of two further Papers. The chairman referred in the discussion to stellite and its cobalt content.

The Recent Munition Conference.

To consider to what extent South Africa can help the Empire in the manufacture of machinery and other articles in the Union, which are at present imported, was the object of a meeting of representatives of the Chambers of Commerce and engineering and other industrial bodies held at the Railway Headquarters Offices, with Mr. W. W. Hoy, General Manager of S.A. Railways, in the chair. Mr. Hoy said that generally the impression of those in authority was that the meeting should be more of a preliminary nature, in order to determine how they could best give effect to the wishes of the Minister of Defence, who had impressed upon him that South Africa would not be expected to undertake actively the manufacture of munitions or ammunition at present. Certain bodies in South Africa, and certain corporations, had already undertaken the manufacture of certain munitions in a small way, but the announcement which he had been asked to make was that the object of the meeting was not to organise the manufacture of munitions, but rather to organise labour and to get help in this country in manufacturing machinery and other requirements necessary to carry on business in South Africa. General Smuts was of opinion that this was the direction in which this country could render the maximum of assistance, for the present at any rate. He had emphasised the advisability of carefully examining all resources at the disposal of this country which would help in making locally our own requirements, and General Smuts would like the committee to investigate, further, whether there was still available in South Africa men of requisite skill and knowledge in the manufacture of munitions, or even who had special training in workshops, so that their names, experience, and craftmanship should be submitted to the Government, and, if required by the Imperial Government, a body of these men would be sent Home in order to assist in the manufacture of munitions in Great Britain. Practically all the large workshops in Great Britain has been placed under the control of the Government, and no order was executed without the consent of the Department of Munitions. The High Commissioner of South Africa had impressed upon Government here the advisability of limiting to the barest necessity our requirements upon Home workshops, and the Munitions Department told him to cut down all Government requirements to the lowest limit. The South African Railway workshops had already undertaken for the Defence Department the manufacture of certain munitions. Recently the demands made upon them had been very much reduced. There were several large workshops well equipped, and if it could be arranged that work other than purely railway work could be better undertaken in these shops, or in co-operation with other shops, this should be done. It might be that in certain workshops on the mines, such, for instance, as in Kimberley, where there was a large well-equipped shop, with men and machinery, certain railway work could be undertaken. In Australia, the Government had commenced, as a consequence of the war and other things, to manufacture their own rails.

Points from the Discussion.

A report in the Johannesburg "Star" states that in the course of the discussion, Mr. E. F. Bourke mentioned that the Pretoria district had stores of iron which, if examined, would be found to be quite satisfactory, and that there was also coal, iron and copper in the north.

Mr. Hoy remarked that although for the moment they might not be able to undertake anything in regard to the organisation and manufacture of munitions, it did not by any means follow that such a request might not come at a later date. If they were engaged here upon the manufacture of munitions, the raw materials would have to be sent 6,000 miles, and then by land anything up to 1,000 miles, and the manufactured article would then have to be transported back to Europe.

It was further pointed out that while the engineering professions and workshops would undoubteduy be called upon to contribute in many ways, one of the most important considerations, probably was the manufacture of wagons, ammunition wagons, wheels, timberwork and various other requisites. The discussion proceeded on the subject of what could be done in workshops, and many articles were mentioned which could be made in South Africa. The War Authorities had asked for 4,000 wheels, and the opinion was expressed that South Africa could make those wheels.

It seemed clear from what Mr. Hoy said that the actual munitions could be made in abundance at Home if South Africa could relieve Great Britain from other orders.

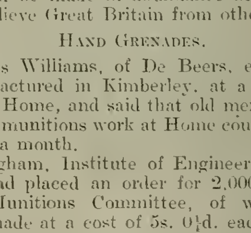
Hand Grenades.

Mr. Alpheus Williams, of De Beers, exhibited a hand grenade manufactured in Kimberley, at a cost of 12s., as against 20s. at Home, and said that old men who would not be accepted for munitions work at Home could turn out 6,000 hand grenades a month.

Mr. W. Ingham, Institute of Engineers, said that the Government had placed an order for 2,000 hand grenades through the Munitions Committee, of which 1,000 had already been made at a cost of 5s. 0¼d. each.

Lists of articles that could be made in South Africa were then received. Kingwilliamstown, for instance, can produce wagons, carts, and so forth. It was shown, in fact, that there is not a town in the Union which cannot do something to help the Imperial Government by manufacturing war material, and it was urged that every Colony ought to have its own munition factory. This Dominion is the only one that had not a small arms factory. The conference showed that there was increasing difficulty in getting material from Overseas. For instance, certain coaches being built at Pretoria and Durban cannot be completed for want of material.

"SKEFKO"



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Johannesburg Consolidated Investment Company,

LIMITED.

(Incorporated in the Transvaal.)

REPORT OF THE DIRECTORS

Submitted to the Shareholders at a Meeting held in the Board Room, Johannesburg Consolidated Investment Company, Limited, Consolidated Building, Fox Street, Johannesburg, on Tuesday, the 9th day of November, 1915, at 11.30 a.m.

ACCOUNTS.

1. The Directors submit herewith the Company's Balance Sheet and Profit and Loss Account for the financial year ended 30th June, 1915.

PROFITS.

2. After making full provision for depreciation, the outcome of the year's operations is a profit of £189,992 5s. 8d., which, with the balance brought forward from last year, viz.: £170,525 8s. 6d., makes an aggregate available balance of £360,517 14s. 2d.

Having regard to the adverse financial conditions prevailing during the period under review, this result must be considered highly satisfactory.

DIVIDEND.

3. On the 21st June, the Directors declared a Dividend of per cent. for the Company's financial year ended 30th June last, which is payable to Shareholders registered at that date. Warrants will be posted to Shareholders on the 28th September.

This distribution absorbs £197,500, the balance, viz.:—£163,01 14s. 2d., being carried forward to next account.

VALUATION OF SHAREHOLDINGS.

4. Where necessary, all the Company's holdings have been written down to the prevailing market prices, although their aggregate market value largely exceeds the amount at which they stand in the Balance Sheet.

FINANCIAL POSITION.

5. The Company continues to hold a large proportion of liquid assets, and the financial strength of its position is fully maintained. Substantial subscriptions have been made to the War Loans issue by the British and Union of South Africa Governments.

MINES IN WHICH THE COMPANY IS LARGELY INTERESTED.

6. As regards the principal Gold Mines under the Company's control, the Directors are pleased to record uninterrupted progress. Satisfactory arrangements, rendered necessary by the War, are in operation for the disposal of the Company's gold, and in respect hereto every assistance has been rendered by the Imperial Government, the Union Government of South Africa, the Bank of England, and the South African Banks.

The Consolidated Langlaagte Mines, Limited, is fully justifying the favourable expectations which have been entertained regarding it, and has been able to reduce its Debenture debt considerably beyond the ordinary redemption requirements and at the same time increase the half-yearly Dividend from 10 per cent. to 12½ per cent.

The results from the Van Ryn Deep continue most satisfactory, and there seems every reason for thinking that this property will prove to be one of the most successful mines on the Rand. The Company paid a Dividend of 15 per cent. for the first half of this year, as against 12½ per cent. for the previous six months.

The Witwatersrand Gold Mining Company (Knights) continues to make excellent profits and to maintain its Dividend at the rate of 50 per cent. per annum.

The Government Gold Mining Areas (Modderfontein) commenced crushing last October, and its monthly profits are steadily increasing. Financial arrangements have been made for the purpose of enlarging the Company's reduction plant, which, when completed, will more than double the results so far obtained. The prosperous future of the Company is assured.

GOLD PRODUCTION.

7. It is satisfactory to record that the aggregate value of the gold produced by the Company's Group of Mines for the year ended 30th June last amounted to £3,622,207, being £603,760 in excess of that for the preceding twelve months. The aggregate amount of dividends distributed for the same period was £999,460, being an increase of £22,268 as compared with the year ended 30th June, 1914.

ESTATE AND TOWN PROPERTIES.

8. The revenue derived from our Estates and Town Properties has been adversely affected by the conditions prevailing in Johannesburg, a large proportion of the male population having been engaged in the campaign which has now been brought to so successful a conclusion in South-West Africa.

CONSULTING ENGINEER.

9. The Directors regret that owing to domestic reasons, the Company's Consulting Engineer, Professor Lawn, has been obliged to take up his residence in England. The Directors desire to record their high appreciation of Professor Lawn's past services, and are pleased to state that he has been appointed Consulting Engineer to the Company in London, and will pay periodical visits to South Africa in the Company's interests.

Mr. W. L. White (who has been in the Company's service for many years as Assistant to Professor Lawn) has been appointed Consulting Engineer in Johannesburg.

ELECTION OF DIRECTORS.

10. In terms of the Articles of Association, four of the Directors, viz., Sir John S. Purcell, K.C.B., and Messrs. J. Emrys Evans, C.M.G., J. Friedlander and Isaac Lewis, retire by rotation and offer themselves for re-election.

ELECTION OF AUDITORS.

11. Messrs. J. P. O'Reilly and Henry Hains, the Auditors of the Company in Johannesburg, and Messrs. Chatteris, Nichols and Co., the Auditors in London, retire from office and offer themselves for re-election.

By Order of the Board.

W. H. MARDALL, Secretary.

Johannesburg, 20th September, 1915.

Johannesburg Consolidated Investment Company, Limited—continued.

Dr. Balance Sheet, 30th June, 1915. Cr.

CAPITAL AND LIABILITIES.

Authorised Capital— (Under Resolution of 23rd November, 1905)	£4,500,000 0 0	
of which £4,345,000 is Registered Capital.		
Capital Issued...		3,950,000 0 0
Reserve Fund...		250,000 0 0
Sundry Creditors		514,302 6 5
Dividend (No. 18) of 5 per cent. declared 21st June		197,500 0 0
Profit Appropriation Account— Balance		163,017 14 2
Contingent Liabilities— Uncalled Capital on Investments, etc....	£56,799 8 1	
		£5,074,820 0 7

ASSETS.

Stocks and Shares.		£2,919,110 4 2
Mining Properties and Advances to Mining Companies		58,348 18 1
Real Estate and Buildings		643,097 18 3
Loans on Mortgage and Real Estate		148,948 6 9
Pre-War Loans against Securities, subject to the Treasury and Stock Exchange regulations		465,657 3 4
Loans at Short Call on Market Securities	£418,323 6 2	
Sundry Debtors and Dividends Accrued	363,224 4 1	
Cash at Bankers and in hand .. .	51,631 15 0	
		833,179 5 3
Office Furniture, etc . .		6,478 4 9
		£5,074,820 0 7

Dr. Profit and Loss Account for the year ended 30th June, 1915. Cr.

To Directors' Fees, Salaries, War Donations and other expenses, less amounts received from other Companies	£34,918 14
,, To Balance, being realised profit for the year, carried to Appropriation Account	189,992 5 8
	£224,911 0 1

By Profits realised on Stocks and Shares, Dividends, Commissions and Sundry Receipts, less South African Income Tax and Amounts written off..	£224,911 0 1
	£224,911 0 1

Dr. Profits Appropriation Account. Cr.

To Dividend No. 18 of 5 per cent. declared 21st June, 1915	£197,500 0 0
,, Balance carried to Balance Sheet	163,017 14 2
	£360,517 14 2

By Balance of Profit and Loss Account at 30th June, 1914..	£170,525 8 6
,, Balance of Profit and Loss Account at 30th June, 1915	189,992 5 8
	£360,517 14 2

S. B. JOEL, Chairman,
A. R. STEPHENSON, Directors.
W. H. MARDALL, Secretary.

We report that we have examined the above Balance Sheet, dated the 30th June, 1915, with the books and vouchers of the Company in Johannesburg and have obtained all the information and explanations we have required as Auditors. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us, and as shown by the books of the Company. We have also verified the securities in South Africa

HENRY HAINS,
J. P. O'REILLY, Auditors.
(Incorporated Accountants).

Johannesburg, 6th July, 1915.

We report to the Shareholders that we have audited the Accounts of the London Office of the Johannesburg Consolidated Investment Company, Limited, dated the 30th June, 1915, and have obtained all the information and explanations we have required. The Audited Accounts of the Johannesburg Office have been properly incorporated in the above Balance Sheet and Profit and Loss Account, and in our opinion, the Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us and as shown by the Books of the Company. We have also verified the securities in London.

CHATTERIS, NICHOLS & CO.,
Chartered Accountants, Auditors

London, E.C., 10th August, 1915.

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Transvaal & Delagoa Bay Investment Company, Limited.

(Incorporated in the Transvaal.)

NOTICE is hereby given that the ORDINARY ANNUAL GENERAL MEETING of the Company will be held in the Board-room, Exploration Buildings, Johannesburg, on TUESDAY, the 30th day of NOVEMBER, 1915, at 4 p.m. precisely, for the following purposes:—

1. To receive and consider the Balance Sheet and Profit and Loss Account for the year ended 31st August, 1915, and Report of the Directors and Auditors.
2. To declare a Dividend.
3. To elect Directors in the place of those who retire in accordance with the provisions of the Articles of Association.
4. To appoint Auditors for the ensuing year, to fix their remuneration, and to transact the ordinary general business of the Company to be dealt with at such Meeting.

The Transfer Books of the Company will be closed from the 24th November to the 30th November, 1915, both days inclusive.

Holders of Bearer Shares who desire to attend or vote at the Meeting must deposit their Warrants at the Head Office of the Company, in Johannesburg, at least 24 hours before the time appointed for the Meeting, or at the London Office not later than the 3rd November, 1915.

By Order of the Board,

B. MOSES,
Secretary.

The Transvaal Gold Fields Building,
Fraser Street, Johannesburg,
20th October, 1915.

THE SOUTH AFRICAN

Mining Journal,

WITH WHICH IS INCORPORATED

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CONTENTS.

PAGE

Notes and News 265

Topics of the Week:

The Outlook 267

✓Re-starting Diamond Production 268

German East Africa 268

Mining Prospects and Railways of German East ... 269

The Position of the " T.G.M.E." 271

The Improved Position of the Luipaardsvlei 272

Arguments Against the Robinson Scheme 274

Progress on Barnato Mines 275

The Valuation of Gold Mining Shares—III. 276

Correspondence and Discussion: " Barnato Group Quarterly Reports"; "African World Red Cross"; " The British Motor Industry and the War "; " Telephone Troubles " 278

The Week in the Sharemarket 280

The Week in the Mining Material and Engineering Trades 281

Engineering Notes and News:

Conference of S.A. Municipal Electrical Engineers 288

Notes and News.

Municipal Electrical Engineers' Conference.

Johannesburg has had the privilege this week of welcoming the municipal electrical engineers of the Union to the first annual Conference of the S.A. Association of Electrical Engineers, which was held under the presidency of Prof. Dobson. Some extracts from the President's inaugural address are printed in this issue; and we hope to print in future issues some of the valuable papers read before the Conference. The new Association has a wide and growing field for its energies, and if the scope of its usefulness is to be measured by the papers read this week, it has already taken a place among the most important scientific and professional societies in the Union.

* * * *

The Robinson Group.

In the nine months ended the 30th September, the Langlaagte Estate and Gold Mining Company made a working profit of £124,147 16s. 10d. The total working costs were £410,258 3s. 8d. (equal to 17s. 11·58d. per ton milled), and the revenue from gold was £534,406 0s. 6d. (equal to 23s. 4·81d. per ton milled). In the same period the Randfontein Central made a working profit of £476,257 1s. The working costs were £1,618,564 15s. 10d. (equal to 17s. 8·67d. per ton milled), and the revenue from gold was £2,094,821 16s. 10d. (equal to 22s. 11·25d. per ton milled).

* * * *

Delagoa Bay Development Corporation.

The profit for the year of the Delagoa Bay Development Corporation to June 30 is £2,366 and £5,126 is brought in. The net profit in Lourenço Marques shows a decrease of £3,247 on the previous year. This is mainly due to the fall in exchange of Portuguese currency, and the directors anticipate a still further fall. In view of this and of the conditions prevailing on account of the war, they cannot see their way to propose the payment of a dividend, and recommend that the balance of £7,491 be carried forward. The total quantity of water supplied for all purposes amounted to 120,638,000 gallons, a decrease of 4,187,000 gallons on the previous year. The number of passengers carried on the electric tramways was 1,168,377, a decrease of 739 on the previous year, and the letting of the offices and dwelling rooms in the building shows a decrease in net revenue of £485. In the opinion of the directors the sums which have been set aside to provide for reserve for depreciation and renewals and for amortisation of property account are adequate.

* * * *

The Luipaardsvlei Dividend.

The Johannesburg Office of the Luipaardsvlei Estate and Gold Mining Co., Ltd., has been advised by cable that the Board of Directors will recommend the declaration of an interim dividend of 9d. (ninepence) per share, less Income Tax, at the annual general meeting of shareholders, to be held in London on the 1st December, 1915.

* * * *

The Position of Spelter.

The London Chamber of Commerce has put forward an interesting scheme respecting the production of spelter, which is all the more important as it is backed by the Australasian section, represent the leading producing companies in Australia, as well as the large users of the metal, which is an essential constituent of brass, and thus of munitions of war. The resolution in question urges the Government to grant a bonus for not less than 20 years on spelter produced at works in Great Britain having an Empire origin when the average monthly price falls below £23 per ton, the bonus to be granted on the same month's output to raise the price to £23. The present price, by the way, is about £68 per ton. As an alternative scheme, the Government are asked to guarantee interest on capital invested in such works. It is evident that a scheme on some such lines will have to be adopted, and that capitalists will have to be guaranteed against loss, which might be caused by dumping in this country from abroad after the war is over. Writing in mail week, a correspondent of the "Citizen" says: "The negotiations in progress as regards the Australian metal industry have been made whereby the whole copper output of the Commonwealth suitable for electrolytic treatment will be treated in Australia; also that a British group has secured the approval of the Imperial Government to distil in Great Britain the whole Australian concentrated zinc output. What would now be of interest to learn is how much progress has actually been made as regards the treatment of zinc ores in this country; the amount of capital involved; and the nature of the Government guarantee for the investment of such capital. It is presumed that the Electrolytic Refining and Smelting Company's works in Australia will be utilised for the treatment of the copper production; and that the German interests therein have been taken over by sympathetic parties to Australia."

* * * *

Union Finances.

From the latest financial statement issued by the Union Treasury, covering a period of seven months; it appears that there was a balance of £1,140,283 in the Treasury on October 31st, receipts having amounted to £23,052,975, and issues to £21,912,692. Commencing with an Exchequer balance of £1,296 7s. 5d. on the 1st of April, the beginning of the financial year, the Treasury received during the seven months to the 1st of October, £8,755,349 on the revenue account, £121,250 in loan recoveries, £10,859,200 from temporary loans raised, £3,000,000 from Union 4½ per cent. debenture issue 1915, £158,389 from surrender revenue votes 1914-15, and £157,490 from surrender loan votes 1914-15. Customs and Excise revenue yielded £3,093,265 as compared with £2,664,692 during the corresponding period of 1914-15, revenue from posts, telegraphs and telephones produced £987,380 in comparison with £951,078, and inland revenue £4,674,702 in comparison with £4,653,636. Issues on revenue account amounted to £10,625,791 as against £9,843,467 during the first seven months of the previous financial year, showing an excess of expenditure over revenue receipts of no less than £1,670,443. The principal heads of expenditure were: Public debt, £3,884,194; Provincial Administrations, £1,207,170; Defence, £1,000,000; Posts, Telegraphs and Telephones, £857,000; Police, £723,975; Prisons and Reformatories, £301,500; Pensions, £263,000; Magistrates, £262,245; Agriculture, £222,824; Public Works, £240,000; Mental Hospitals and Leper Asylums, £168,859. On the loan account the issues were £11,286,557, including £7,200,200, representing war expenses and £1,179,432 spent on railways and harbours. The cost of raising loans £99,151 and temporary loans to the amount of £2,257,742 were repaid. Other issues on the loan account were £543 in respect of 1914-15 revenue votes, and £200,000 in respect of 1914-15 loan votes. A small credit balance is possible at the close of the financial year. If this is secured it will be due to the expedient of debiting to loan account all expenses in excess of one million sterling incurred by the Defence Department during the current year. The million in question has been expended by the end of August, and for the rest of the current year the monthly outlay on defence, which probably runs into at least £100,000 per month, is being paid out of loan funds, hence it must not be rashly assumed that the finances of the Union are now at equilibrium.

* * * *

Hudson's Munition Making.

The impression seems to have gained ground that many English manufacturers are now making inordinate profits, owing to the passing of their German competitors. In most cases, however, this is erroneous, as a great part of British firms' energies is being devoted to the making of war munitions. For instance, the well-known Gilderstone firm of Messrs. R. Hudson, Ltd., are busily occupied on Government work, though, of course, it is not desirable to print particulars. It may, however, be mentioned that, they are turning out several miles of light railway every day for use in the trenches in France and wagons for running on them. They have also sent quantities of "U" shape side-tip wagons, which are familiar to people on the Rand, and have also a very large contract for 9½ inch Howitzer shells.

Consolidated Gold Fields Meeting.

According to Reuter, Lord Harris made an interesting speech on Tuesday, when presiding at the annual meeting of the Consolidated Gold Fields of South Africa, and his remarks were warmly applauded throughout. He emphasised the importance of dividends being earned in the production of gold, the transit of which had been entirely successful against any enemy attempts. The company's finances were very strong, and it occupied a liquid position which could be very useful to the Government. Lord Harris declared that their business might have suffered from war causes, but fortunately the South African gold mining industry was practically normal. He paid a tribute to General Botha as a military leader and statesman, and said the roar of the mills had been as continuous as the roar of the guns. There might be an increase in the price of chemicals, etc., but he hoped the increased native labour supply would remain constant. He dwelt at some length on the position of the Robinson Deep, showing that they had acted fairly to the Robinson Deep shareholders, as was evidenced by the satisfaction of the great majority. Lord Harris touched briefly on the company's interests in Rhodesia, America and West Africa, and expressed appreciation of the patriotism and public spirit of the company's employees who in London, the Transvaal and Rhodesia had rushed in satisfactory numbers to the assistance of the Old Country. In this connection he congratulated Mr. Tulloch, one of their employees, who has received the Military Cross. Despite the disturbances and the situation the world over, the work of the year had been satisfactory. This was due to British supremacy, which enabled gold to be marketed. He urged that it was essential that London should remain the free and stable gold market of the world under the protection of the Fleet. He read a letter from Mr. Christopherson, of Johannesburg, describing the splendid patriotism of the skilled workers there, who, though short through numbers joining the colours, were all co-operating to the utmost, as the gold industry was essential to the Empire, otherwise they would not remain at home.

* * * *

Coal Export Trade and the War.

A supplement to the *Board of Trade Journal* gives in full the prohibitions of export in force in British India, the self-governing Dominions, Egypt, and certain other British possessions. We extract the following particulars relating to coal and certain other products. From British India, Welsh coal is allowed to be exported only in quantities sufficient for bunker requirements; other coal and coke can only be exported to British territory; amongst the other articles prohibited are dyes, manganese ore, mining cables, railway material, wolfram and tungsten. The export of coal is prohibited from New Zealand to any destination, except with the consent of the Minister of Customs; many other articles are comprised in the list of absolute contraband, including aluminium, ammonia, ferro alloys, ingredients of explosives, lubricants, a number of ores, and metals, etc., etc.; fuel, other than mineral oils, is conditional contraband. From the Union of South Africa the export of coal and coke (excluding coal in reasonable quantities for bunkering purposes) is only allowed to British territory, but the Commissioner of Customs and Excise may issue conditional permits for export to other destinations; exportation of the following goods, *inter alia*, is prohibited, except with the permission of the Minister of Defence: Armour plates, etc., explosives and the ingredients thereof, mining cables, shipbuilding materials; exportation of the following goods is prohibited, except with the permisison of Collectors of Customs, to destinations in the British Empire and countries of Allies and neutrals: Benzol, coal tar and products, dyes, manufactured fuel, blast furnace oil, shale oil fuel, steel wire, rope, toluol, etc.; exportation of the following is permitted to places in the British Empire: Amonnia, copper, ferro-alloys, fuel other than mineral oils, certain metals and their ores (tungsten, molybdenum, vanadium, nickel, selenium, cobalt, manganese, tin, wulfenite); the export of copper ore, hæmatite iron ore, magnetic iron ore, iron ore, hæmatite pig iron, iron pyrites, tin-plates, and steel wire is prohibited to all foreign ports in Europe and on the Mediterranean and Black Seas, other than those of France, Russia (except Baltic ports), Belgium, Spain and Portugal. The export of coal from Canada is prohibited to all destinations, other than the United Kingdom, British possessions and protectorates, France, Italy, Russia (except Baltic ports), Japan, United States, when for consumption in United States only, or shipped to specified consignees in United Kingdom *via* United States, or exported *via* United States under licence or dispensation from Canada; articles that may only be exported to places in the British Empire include coal tar, coal tar products and dyes, explosives ,ferro-alloys, metals and ores, blast furnace oil, shale oil, steel wire rope, wagons, and steel wire ;there may be shipped to ports o fthe Allies in Europe, including Spain and Portugal, copepr, iron and nickel ore, railway material ,shipbuilding material, etc.; the export of tin and terne-plates is prohibited to Denmark, Holland, Norway and Sweden. The export of coal and briquettes is prohibited from Egypt ,but permission may be given to ship a quantity strictly necessary to enable a ship to reach the nearest neutral port. From other colonies and protecorates ,generally speakinfi, the export of coal is permitted to places in the British Empire, but it may be noted that the export of Australian coal is prohibited from the Straits Settlements to all destinations, other than a Malay State under His Majesty's protection, and the States of North Borneo and Sarawak. The supplement does not contain the proclamations issued by the Commonwealth of Australia, which have not as yet been consolidated.

* * * *

Waste of Hiring and Firing.

The economic waste involved in the indiscriminate hiring and firing of employees has not been studied with care in respect to the mining industry, but a recent address on this subject confined to manufacturing lines forces some very startling conclusions. The figures given apply to 12 different establishments employing about 40,000 men, and the speaker estimated that the money lost in one year due to the problem of hiring and firing amounted to $831,030. He fixed the cost for the purely clerical work of hiring and recording discharge at 50c. per person. Just how much parallelism there is between manufacturing and mining, in this regard, it is not necessary to discover for the purpose of emphasising this point, so often overlooked. When a miner gets huffy and demands his time on the spot, the bother and inconvenience to the foreman and shift bosses and to the clerical force in the office are perfectly obvious, and are invariably resented in a psychological way, at least, and a money cost of the transaction might easily be figured, which does not come to mind when, for some equally trivial reason, the man may be handed his time. In this connection the *Engineering and Mining Journal* points out that aside from the purely clerical cost of the hiring and the discharge, is the large economic waste involved in instructing a new man in his duties, if it be only to the extent of conducting him to his place of work and,informing him where he will find the tools with which to work, and getting him acquainted with the system employed at that particular mine. If he is simply taken to the heading and turned loose on a drill, he is at a loss to know where his wrenches are, the air-pipe connection, the air valves and various other things, and he will lose a large amount of time ferreting out the knowledge he must have. While he is doing his best to acquire the information which should have been given him at the start, he may make some mistake that will get him an immediate discharge from an irascible foreman or superintendent. This is where the big item of waste in this problem comes in. Next to the irascible superintendent, the new superintendent is the greatest offender in this regard. His strong point in his own mind when he first attains authority, is his willingness to exhibit the courage of his convictions by firing promptly any man who does not come up to the chalkmark of expectations. He calls it enforcing discipline. The inexperienced superintendent is wholly unaware of the long period his predecessor required to build up his organisation, the paternal way in which he sometimes had to handle his men, and he has not yet learned that an efficient superintendent must know what not to see just as well as what he should see. While he has probably never figured out the cost in dollars and cents, the experienced handler of men, unless the cause is unmistakably flagrant, is rarely quick on the trigger at discharging employees.

TOPICS OF THE WEEK.

THE OUTLOOK.

The coming campaign in East Africa will doubtless occupy the attention of the session of the Union Parliament that opened this week, to the exclusion of mining affairs. The industry, as Mr. Imroth indicated the other day, will suffer its eclipse in this respect with equanimity and will bend itself no less heartily to the great task of improving health and ventilation on the mines, and stamping out the miners' phthisis evil. Though the next quarterly meeting of the Chamber of Mines will not take place till just previous to the Christmas holidays, which doubtless means that we will not have for some time any public pronouncement regarding the position of the industry as a whole, it must not be assumed that nothing of interest is happening. One important question before the industry is the number of employees that it will be possible to spare for the coming East African campaign, without reducing the productive power of the mines. On the one hand it is naturally desired to free for service every possible fighting man in order that the struggle may be short and decisive. On the other hand, there has to be considered the clearly-expressed wish of the Imperial Government that nothing be done, and no man released, that might impair the production of gold. That very careful consideration is being given to the problem goes without saying, and the success that attended the solution of the same difficulty in the case of the South-Western campaign encourages us to expect that all interests may here again be reconciled. This white employee question is accompanied by some anxiety in regard to the finding of employment for the recent, unexampled influx of native labour. It is an open secret that so unexpected and plentiful was the supply of recent months that, on some properties, difficulty was for a short time experienced in finding employment for all. Many mines were able to put " boys " on to breaking extra rock, and building up ore reserves against the recurrence of the inevitable days of labour shortage. Fortunately, however, the trouble was of brief duration and has now passed. The excellent rains, ploughing time, and the news of the part re-opening of the diamond mines appear to have augmented the " wastage " of late, and the supply can no longer be said to outrun the demand. In fact, should the diamond mines increase their operations to any considerable scale the effect would very quickly be felt on the whole native labour supply of the Rand. Nor does the industry lack preoccupations other than labour, white and black. Only last week a great pother was raised because, forsooth, of a silly paragraph—emanating from the fertile editorial brain of some obscure London paper—woven round an alleged attempt of a Rand house to defeat common sense and the Government by exporting its gold to New York instead of to London. A whole batch of denials, couched in every conceivable form of pained surprise, was extracted from indignant leaders of the industry, to the enrichment of the columns of our enterprising evening contemporary. In our innocence we had refused to take notice of the libel, and it still seems to us that the publicity gratuitously given it merely played into the hands of the author of the calumny. The truth of the matter, of course, is that the export of Rand gold is carried out under the surveillance of the Imperial and Union Governments, as anyone who has taken the trouble to follow industrial events since the outbreak of the war should know. Lord Harris, we are glad to note, appears to have given London a timely reminder of what the Rand mining industry is doing at this juncture. " The roar of the mills," he said, in picturesque phrase, " is keeping pace with the roar of the guns." And again: " The Rand industry is doing its bit." The industry, of course, is merely doing its duty, and wants no special praise for doing it. But it does, at least, expect and deserve in return to be spared the cowardly insinuations of the London gutter-press, designed to impugn and discredit its loyalty, and the veiled innuendoes of ignorant, if well meaning, organs nearer home.

RE-STARTING DIAMOND PRODUCTION.

As foreshadowed by Mr. S. B. Joel last week, the chief diamond mines are to re-start operations, on a restricted scale, at the beginning of next year. Instead of concentrating operations at one or two mines, it appears to be the intention to work several on a small scale; and there are doubtless good reasons for this decision that do not appear on the surface. Great credit, we believe, is due to the Diamond Syndicate for so nursing the diamond market as to make the present step possible. We have heard so much criticism of that organisation from all sorts of public censors of morals that it is almost forgotten that South Africa owes the Syndicate a big debt of gratitude for so successfully weathering the international crisis in the diamond market. But for the intervention and operations of that body, the diamond market would be in a worse state than the ostrich-feather industry to-day, and with far less hope of recovery. Mr. Joel's visit to Kimberley this week has confirmed him in his decision to recommend a resumption of work on January 1st; and we understand that the Premier and Jagersfontein will resume operations, also, of course, on a limited scale, at the same time. An important point to be noted is that the work offering at Kimberley will no more than absorb the white labour offering there; and that those journeying to that centre in search of work are liable to be disappointed The *Diamond Fields Advertiser* utters a grave warning in regard to this matter, which may be quoted. "As we have previously pointed out," says that paper, "the renewal of industrial activity, in however limited a degree, cannot but be attended with material benefit to Kimberley and the other centres concerned, and it will be a matter of general satisfaction to the public that circumstances have been held to justify the step. In drawing attention to the original reference to the subject by Mr. Joel, we specially emphasised the fact that, as he had pointed out, the operations to be undertaken must of necessity, for reasons that would be readily understood, be on a much smaller scale than those carried on before the war. In this connection it may be well to make it clear at once, in order to avoid the possibility of any misapprehension on the part of men from elsewhere who may be seeking employment, that there are without doubt already sufficient—indeed, we may venture to say more than sufficient—men in Kimberley to carry on all the work which it will be possible to undertake. The company will naturally give the preference to the old hands on the spot, who have been previously in their employ, and in view of the number of these old-timers available it is quite certain that there will be no necessity or opportunity for the taking on of outside labour. It is important that stress should be laid upon this point, and that due note should be taken of it in other parts of the Union, since an influx of outside labour, in the hope of finding absorption by De Beers, would lead only to disappointment, and such a course would be neither in the interest of the men themselves nor of the town. We hope this will be thoroughly understood, and that after a clear statement of the position nothing of the kind need be feared. The policy of De Beers and the other companies concerned must continue to be strictly governed by the sound principles of which long experience has conclusively shown the wisdom and practical necessity, and which were again clearly defined and insisted upon by Mr. Joel in his recent speech. This means that only a limited amount of work can be done, and in justice to the company's old employees it is only right that they should have the first claim." The paper concludes: "That the state of the diamond market should be held to permit any resumption of work at all, in however restricted a degree, during the continuance of this great world war, is a fact on which we may well congratulate ourselves. Few people, probably, can up to recently have had any hope or anticipation of anything of the kind whatever taking place with the advent of the New Year. The need for the most extreme caution and circumspection in coming to so momentous a decision must be obvious to all. The governing factor, as the directors of De Beers, the Premier and the Jagersfontein companies recognise, is the nature of the demand, and it would be impossible to conceive conditions when it was more imperative to have the most scrupulous regard for this fundamental principle than those created by the war."

GERMAN EAST AFRICA.

All eyes in South Africa are now turned to German East, to which the immediate war interest of the Union has shifted. Though this war is not being waged for treasure or territory, still it is good to know that the country being fought for is not a howling waste or a barren wilderness. In response to numerous enquiries, therefore, we print in this issue some facts bearing on the economic possibilities of German East, from which it will be seen that the territory is one of considerable economic value and importance. For an African Protectorate, it is fairly well served by railways, and prospectors appear to think highly of its mineral possibilities. Just previous to the war there had been almost a boom in prospecting, and despite the difficulty presented by the tropical vegetation, some promising discoveries appear to have been made. The facts printed in this issue speak for themselves. It is noteworthy that in East Africa the ocean and the great line of lakes that form a chain of inland waterways are cut off from each other, and engineering science provides by rail the missing links. On the other hand, this very fact makes in a sense for the unity of Africa. On the map the eye follows the lakes up the length of the continent from south to north, not diverted at this point or that to the coast, and it becomes more evident than before that Africa is one. How strong a hold Great Britain has secured upon these great lakes has often been noticed, and it will be borne in mind that, as a colonising power, she has long known in North America the value of inland seas. "The mainspring of British action," says Sir Charles Lucas, "was the competition of Germany, a new colonial power, active from having come late into the field, specially active in Africa because in Africa there was room for a newcomer." And that is one reason for the campaign in East Africa to-day. In addition to the essential unity of Africa, which makes it necessary to eradicate German influence once and for all, there is the promise of unknown Africa to be considered, and the importance of its retention in the hands of ourselves or our Allies. "When the trouble of the war is over the real discovery of Africa will begin," wrote Sir Harry Johnson recently. "We have only so far set out Africa with tolerable correctness on the map and glanced with an inquiring and scientific eye on its surface in some small portions. These investigations from 1884 onwards revealed or suggested such astonishing sources of wealth to humanity that they have stimulated that colonial movement in regard to Africa which lies at the base of the present war. What has been revealed, however, is probably trifling compared to what remains to be discovered. I venture to predict that a good deal of the area of the Sahara desert will be found to be rich in oil-bearing strata, and some of its mountains and plateaux on the verge of the Sudan wealthy in copper and perhaps in tin; that the mineral wealth of Somaliland, of Abyssinia, of the Nile-Congo water-parting, of Darfur, of Katanga above all, of Eastern Angola, of Liberia, of Rhodesia, Portuguese East Africa, Nyasaland and the northern and central Cameroons will eventually justify the vague surmises or the actual predictions of prospectors." Again, says the same writer: "The most recent results of exploring Africa have led to *some of its deserts proving more valuable than regions obviously fertile and attractive to the eye.* The high veldt and the northern Karoo in South Africa; Namaqualand and many parts of the northern Sahara were regarded as hopeless, eternally desolate, and worthless tracts of country a few years ago; which would never pay for opening up. Now they turn out annually millions of pounds' worth of diamonds or copper, of phosphates and other mineral manures, or yield obvious indications of oil-bearing strata below the surface. Unless Western and Eastern Europe emerge utterly bankrupt from this devastating war, *we may permissibly imagine that they will next put their capital, not into the making of further armaments to destroy one another, but into the warfare against hostile and grudging Nature.*" German East, as General Smuts showed in his great speech last Saturday night, must now therefore be taken in hand; the unity of Africa demonstrated by the impossibility of its remaining longer in enemy hands, and the several parts of Africa in Allied and friendly keeping left free to go forward, unhampered by alien neighbours, to the great destiny foreshadowed for them.

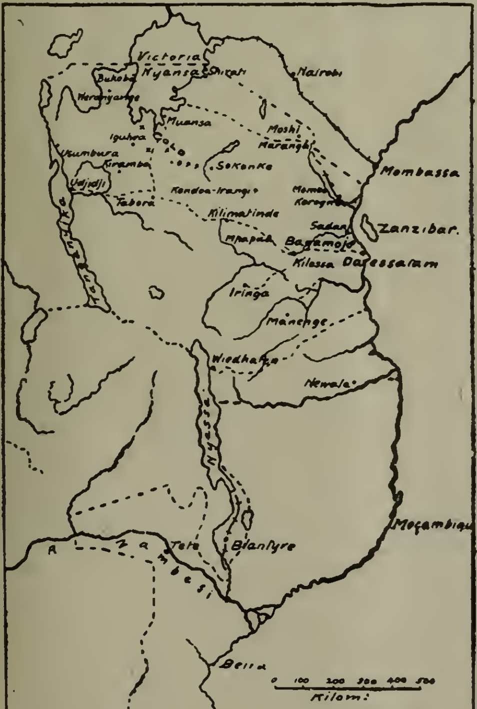
MINING PROSPECTS AND RAILWAYS OF GERMAN EAST.

Railway Development and Gold Deposits—Extracts from Engineers' Reports—War Stops Prospecting—A Land of Promise.

German East Africa is a territory comprising 384,000 square miles, with a native population estimated at about 7,000,000. From an Imperial point of view the principal point of interest in the country is its geographical position. Sandwiched between North-Eastern Rhodesia and British East Africa, it has always constituted a barrier to the fulfilment of the great Imperial project of Cecil John Rhodes, to construct an all-red railway route running through British territory from Capetown to Cairo.

The Railways.

German East Africa owns at the present moment two railways, the Usambara railway in the north, and the Tanganyika railway which, starting from Dar-es-Salaam, cuts the colony into approximately two halves. Both railways were originally intended as short pioneer lines, and the Usambara railway remains as such to the present day. The end-station of the line is at the foot of Kilimanjaro. Lake Tanganyika was reached last year by the German railway. The Belgian railway (Lukuga) is also at the lake. When both these railways have been constructed and a steamer service has been organised on the lake, the journey across Africa from east to west, or from west to east, considered less than ten years ago to be one of the most perilous journeys in the world, will have been reduced to a trip not exceeding fourteen days in length. Regarding the extension of the German railway system to Lake Nyassa, the third of the great equatorial lakes of Central Africa, nothing definite is known, though it must be admitted that the exploitation of a railway in this direction is fraught with exceptional possibilities. It was originally intended to run a line from Lindi, or from the beautiful natural harbour of Kilwa-Kissiwani, to Lake Nyassa, but apparently the scheme has been dropped in view of the sterile tracts of land which would have had to be crossed before the productive shores of the lake had been reached. But a branch line from the Tanganyika railway, somewhere between Ngerengere and Kilossa, or a main line from Dar-es-Salaam, would tap the rich river lands of the Rufiji, as well as the healthy and productive plateaux of Mahenge or Iringa, and thus reach the no less fertile fields of Neu-Langenburg on Lake Nyassa. However, when all is said and done, it will be impossible for these railways to open up all the fertile districts of German East Africa unless they are worked in connection with roads acting as feeders.



Sktech Map of German East Africa, showing Gold Occurrences.

Mining Prospects.

Rand mining men, who have visited German East Africa, speak very highly of the mineral possibilities of that country. Mr. H. Loret, well known as an ex-mine manager on the Rand—now interned in G.E.A.—visited the country some time ago on behalf of the German East African Syndicate, and extracts from a report by him have appeared in our pages. It is an open secret that the property he was originally sent to report upon proved unattractive, but that he was able to peg off for his syndicate certain gold-bearing claims of a greater promise. Another ex-Randite, Mr. Jeffries—who died last year at Nairobi—some time ago returned from a long and adventurous prospecting trip through the same territory, and spoke even more favourably of its possibilities. The railway from Dar-es-Salaam to the Lake traverses a wonderful country of rubber, copper and tobacco plantations. Mr. Jeffries declared that the country was traversed by a well-defined gold-bearing belt; and the accompanying sketch made by us from an official map kindly lent by him, shows the position of the several reported gold discoveries. No geological survey has, however, been made, and the value of the discoveries can only be guessed at. Gold is not the only mineral found, as tin, copper and mica have been traced. The Sekenke Gold Mine is producing and paying dividends. Mr. Jeffries spoke enthusiastically of its prospects, the value at 500 feet vertical being over 2 ozs. per ton. His report states:—"Water is abundant. During the dry season most of these rivers are partially dry or water stands in big pools, but by digging five or six feet in the sand, running clear water will be obtained, and this method is adopted by the natives for watering thousands of cattle. In many parts very fine mining timber, chiefly acacias, can be had for the price of cutting it down. As the country is thickly populated, and boys are to be had from 5s. to 8s. per month, inclusive of food, no difficulty will arise on this point for many years to come. At the Sekenke Mine and at Lassama Mr. Loret has seen the natives working underground, and was told that these natives take very kindly to mining and have no fear of going underground. The biggest part of the German East African hinterland is a high plateau, about 4,000 feet above sea level, resembling the rolling plains of the Transvaal, and in some parts a copy of Southern Rhodesia. The nights are rather cold, and the heat during the day is not oppressive; in fact, malaria is very little known, and the plateau is considered healthy." Another well-known Rand engineer, Mr. Oliver King, also reported on the territories before the war, for a Rand house.

Other Resources.

In the current number of the *Bulletin of the Imperial Institute* further attention is given to the "Economic Resources of the German Colonies," the agricultural and forest products of German East Africa being specially considered. These products include copra, ground nuts, sesame seeds, oil palms, castor oil, beeswax, cotton, wild rubber, coffee, grain, tuberous plants, sugar-cane, and tobacco. All these products are in native hands. In addition, the German East Africa Company conducts a considerable sisal hemp industry—over £367,000 worth was exported in 1912—and Europeans are also responsible for the cultivation of cotton, kapok, plantation rubber, and gutta-percha. The exports of the two last-named products for 1912 reached a combined value of over £362,000. Germany has been receiving the bulk of the products; but a certain amount of plantation rubber, coffee copal, hides and skins (of which the total exported value for 1912 was over £203,000), and ivory has been going to the United Kingdom.

A Recent Account.

Mr. J. L. Cotter, who knows G.E.A., writes from Nairobi:—"As possibly the only man in B.E.A. who has lived many years in G.E.A. as a trader and hunter, I can perhaps claim a knowledge of the country greater than most. G.E.A., like B.E.A., must be divided into three sections: Coast, highlands and the lowlands round the lakes. The highland area of G.E.A. is not, as is generally supposed, of any less area than in B.E.A., but it is not so compact, nor does it reach such an average altitude. Some of their highlands are magnificent cattle country, and any man of Ross's Scouts could say how good the grazing of the parts adjoining the Kisii border is. From Ikoma to Sonjo the country is equally well suited to stock, and at Ncorongoro, Herr Lerdentop's farm, there is a stretch of land as good as any other part of the world for ranching. Longido to Kilimanjaro and Meru is much poorer land and drier; still Longido is itself fair cattle country and quite suitable for sheep. The high ground round Mount Meru is first-class cattle country, as is the land round Nairobi. Both Arusch and Moschi are the centres of large coffee plantations equal to any in B.E.A. Sisal seems to grow almost anywhere, and labour is both more plentiful and of better quality than in B.E.A. Ruanda is, however, perhaps the best part of G.E.A. both for stock and agriculture. But the real wealth of G.E.A. lies in its minerals. Gold is very plentiful and only needs good prospecting in order to find several good propositions. There are at present in the Mitanya district at least 100 places where gold has been found, many of them running over an ounce to the ton. Silver, mica, quicksilver, and lignite have been found in many places, but have not yet been worked. At the start of the war there were about 7,000 whites resident in G.E.A., of whom about 1,000 were foreigners, chiefly Greeks and English (Boers), about 1,000 were sailors from the ships, and nearly 1,000 were missionaries, about 500 to 1,000 soldiers, and another 1,000 officials. I don't believe there are 1,000 German settlers (males) in G.E.A. The remainder are women and children, roughly about 1,500. The small German resident population is a great advantage, if G.E.A. is taken, as it would do away with any large irreconcilable element. Taken as a whole, G.E.A. has more rivers and a bigger rainfall than B.E.A., and as an all-round economic proposition should be of considerably more value."

Prospecting at a Standstill.

Away out in German East Africa, about 500 miles from the sea, and half that distance from a town of European settlement, Mr. C. M. Curr, of Queensland, was (says the *Melbourne Argus*) following a trail of undoubted wealth when he was rudely acquainted on August 6th by a German military officer that he must quit the country. In the course of an interview, Mr. Curr related some of the stirring experiences with which he met on his hurried departure from a hostile land. Having disposed of his Avon Downs Station, on the Gulf of Carpentaria, Mr. Curr was attracted to Eastern Africa by the possibilities of big game shooting, and while engaged in that exciting pastime came across a party of Europeans, who, being without great means, were developing an auriferous stretch of country. Mr. Curr was not slow to grasp the opportunity, and soon had a syndicate formed to thoroughly exploit the ground. So promising were the tests that machinery was ordered, and a grant obtained from the German Government, who were only too ready to assist others to develop their territory. Machinery was on its way when the war broke out. Mr. Curr and his companions were ordered in from the mine to Fort Acoma, and, there, after declaring that they would neither take up arms against Germany nor give away any information concerning the territory, garrison, etc., were given a friendly send-off. Again, a correspondent writing to a Queensland paper says: I have just returned from German East Africa, and I was fortunate in discovering a very fine gold reef of large formation, about 12 yards wide; the lode can be traced for over a mile. I have pegged 164 acres, and intend returning again in the future, when I hope to locate other reefs. This is in a new district, and from what I have seen will be the best find here. There will be a move here before long in mining. I hear that in German East Africa tin has been found, and in three months' time I hope to go to a part for tin—it will take beating, judging from specimens I have seen. It is very difficult prospecting here during the wet season, as the long grass is so high, but in the dry season it can be burnt off, and it is then a picnic prospecting. A prospector living here must be fairly strong."

Mica in German East.

A high-grade green to brown mica, equal in quality to that of India, is mined in the Uluguru Mountains, G.E.A., and neighbouring ranges, says the last volume of "The Mining Industry." The rock is a variable biotite gneiss cut by pegmatite dykes that are nearly vertical and range from 30 to 70 ft. in thickness. The chief development has occurred in the last ten years, and the output is much smaller than that of India. It is said to excel in splitting quality and, in the best grades, to yield smooth, perfect sheets that are preferred for use as diaphragms in phonographs.

More About Railways.

Some interesting information relating to railway expansion in German East Africa is contained in the *Board of Trade Journal*. The report is sent by the British Consul at Dar-es-Salaam, and was written before the outbreak of the war. It states that there are two railway lines in the German East African Protectorate—the Usambara line and the Central or Tanganyika Railway. The Usambara Railway is 220 miles long and runs from Tanga to New Moschi, at the foot of Mount Kilimandjaro. The line was commenced in 1893, and the first section (to Mombo, 80 miles from Tanga) was opened to traffic in 1905. The remaining portion of the line was opened in February, 1912. The railway is leased to the Deutsche Koloniale Eisenbahnbauund Betriebs-Gesellschaft (Lenz & Co.), which constructed the Korogwe-Mombo section. The line runs through the picturesque district of the Usambara Valley and the Pare Mountains, and numerous plantations have sprung up along its length. Its effect on the trade of Tanga is shown by the following figures:—Exports from Tanga in 1898, £21,400; in 1907, £133,000; in 1912, £666,341. The Central Railway, which runs from Dar-es-Salaam to Lake Tanganyika, a distance of 780 miles, was begun in 1905. The first section was finished as far as Morogoro (130 miles) early in 1908, and in the same year the extension as far as Tabora (440 miles from Morogoro) was sanctioned. This work was carried on with such energy that Tabora was reached in February, 1912, more than two years before the date fixed in the original project. The continuation of the line to Tanganyika was sanctioned in 1911; the River Mlagrassi, the chief difficulty, was bridged in the spring of 1913, and the railhead reached the lake at Kigoma, near Ujiji, on 2nd February, 1914. This central line, which will become the main artery of traffic, with branch lines to the north-west and possibly to the south-west (Lake Nyassa region), is expected to play a most important part in the development of the trade of the Protectorate, and in opening up the Tanganyika district. Lake Tanganyika appears to be regarded as the key to the trade of Central Africa, and the Germans have pushed on their railway with such remarkable energy that they are the first on the spot. It is now possible to travel from Dar-es-Salaam to Kigoma, on Lake Tanganyika, in two days and two nights, a journey which it used to take the caravans 60 days to accomplish. When the short stretch of line (about 170 miles) between Lukuga on Tanganyika and Kabola on the Congo is completed, it will be possible to travel across Africa, from Dar-es-Salaam to Boma, in about three weeks by rail and steamer, if direct connection at each stage is assumed. The return journey will occupy more than a month, as the steamers take twice as long to go up the Congo as to go down stream. Communications between Europe and Rhodesia will also be greatly facilitated, as, allowing 12 hours for the steamer journey between Kigoma and the south end of Tanganyika, and again assuming direct connection at Dar-es-Salaam and Kigoma, it will be possible to reach Abercorn from London in about 24 days. It is anticipated that the German Central Railway will deal with much of the traffic to and from the eastern portion of the Congo and Northern Rhodesia.

THE POSITION OF THE "T.G.M.E"

Review of Quarter's Results—A General Improvement.

During the three months ended September 30th, a profit of £38,165 was earned by the Transvaal G.M. Estates. Insufficient unskilled labour and the extra work of cleaning up after the floods prevented the running of the Central Mill at its full capacity, and also prevented development and prospecting work being carried on as vigorously as desired. On the whole, however, there was a general improvement as compared with the previous quarter. At the Central Mill the tonnage crushed showed an increase of 2,320 tons over the previous quarter, working costs decreased by 1s. 0·6d. per ton, and profits increased by 2s. 10·5d. per ton. Some 4,300 tons of accumulated sands from the old Clewer were treated at a profit of £697 11s. 6d. In the aggregate the profits for the three mines were £4,983 greater, and the working costs 1s. 1·7d. per ton less, than for the preceding quarter. No material change has taken place in the grade of ore developed.

PROSPECTING.

Work has proceeded as vigorously as the supply of labour would permit. There is nothing fresh to report from the old Beta Mine, Olifantsgeraamte, Grootfontein and Goedverwacht. In Dark's Gulley, though some payable patches have been opened up, the results have been on the whole disappointing. Work was stopped at Klipkraal owing to unsatisfactory results. On Finsbury No. 621 considerable work was done, with a view to locating the mynpacht which must be selected in the immediate future. On the discoverer's claims considerable washing will have to be undertaken before any definite information can be gained as to the value of the alluvial.

CENTRAL MINES.

In the Duke's Hill South Mine the extension of the drives, following the dip of the reef to the west, has not given encouraging results: these drives are, however, still being continued. At the Peach Tree Mine development work has disclosed nothing new of importance. The work of coupling-up lota with the Peach Tree Tramway System has been pushed ahead, but is not yet complete. At the Theta Mine disclosures have, on the whole, been encouraging. Work has been continued on the Theta Extension; but results here have recently not maintained their original promise. At the Graskop Mine, in pursuing the reclamation, many difficulties were encountered, which hindered any energetic measure of development and rendered the winning of ore most difficult. At Brown's Hill development work has been energetically carried on with fairly satisfactory results; whilst the tramway to connect with the Peach Tree Tramway has made good progress.

ELANDSDRIFT.

The work on the additional five stamps and extra cyanide plant has been practically brought to completion, though delays in connection with certain essential parts of machinery have prevented the new plant from being put into commission as yet. It is hoped, however, that the full plant will be at work in the very near future. In the mine continued work in opening up reef to the dip has been much hampered by a very heavy flow of water which has been encountered.

VAALHOEK.

The erection of the new tube-mill and accessory plant was delayed owing to all ox-transport being stopped on account of tick-fever. The roads, however, were again opened towards the end of September, and it is hoped to have the plant running at a very early date. Work towards the dip of the river section, south of the Transverse Dyke, has been much hindered by the inordinate quantity of water encountered. Every effort has been made to grapple with this difficulty, but as yet it has not been entirely overcome. Recent indications have, however, been rather more favourable.

FLOOD CLAIM.

The claim for loss of profit due to flood has now been settled with the underwriters, and the net amount, viz., £20,614, is in process of collection.

Consolidated Gold Fields Group.

The following are the particulars in regard to the outputs and profits for the month of October, 1915, of the undermentioned companies of the Consolidated Gold Fields group:—

Company.	No. of Stamps.	Tube Mills.	Tons Crushed.	Gold declared. Fine Ozs.	Total Profit.
Simmer and Jack ...	320	7	70,500	18,468	£29,069
Robinson Deep ...	160	10	59,200	18,567	25,087
Knights Deep	400	11	110,000	19,932	16,184
Simmer Deep	220	10	71,300	12,992	2,441
Jupiter	80	5	21,000	4,616	—
Sub Nigel	30	2	7,770	3,487	3,536
Totals	1,210	45	339,770	78,062	£76,317

The sundry revenue included in the above total declared profit is as under:—Simmer and Jack, £1,800; Robinson Deep, £53; Knights Deep, £123; Simmer Deep, £628; Sub Nigel, £305; total, £2,909.

Reserve Gold.—Simmer and Jack, 5,800 ozs.; Robinson Deep, 2,230 ozs.; Knights Deep, 1,966 ozs.; Sub Nigel, 795 ozs.; total, 10,791 ozs.

Jupiter G.M. Co.—Loss on working, £1,396; less sundry revenue, £1,081; net loss, £315. The loss due to absorption of gold in plant is less than anticipated.

Simmer Deep.—Owing to large increase in tonnage, recovery of the gold has been adversely affected. Improvement in grade later on in the month should become apparent in next month's figures.

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THE IMPROVED POSITION OF THE LUIPAARDSVLEI.

Resumption of Dividends—Growing Profits—Development Better—Points from the General Manager's Report.

The announcement of the dividend declared this week by the Luipaardsvlei Estate calls attention to the improving position of that company. The last dividend declared was in 1909; and the fact that the company has in the meantime incurred heavy capital expenditure out of profits and now entered upon the steady dividend-paying stage reflects credit on the careful management of the local board, under the chairmanship of Mr. J. Andrew Cohen. The floods of the early part of 1915 caused a set-back in the returns for a few months, but since then the profits have steadily grown, until the cash position has become a thoroughly sound one, and the present division of profits by no means represents a distribution "up to the hilt." Since the last financial year of the company closed, *i.e.*, on June 30, the development position has been steadily improving, and no credit has been taken for the South Reef opened up. The annual report will be issued in London in the next few days; and in the meanwhile we are enabled to print a few extracts from the last annual report of the general manager, Mr. C. B. Saner, that for the year ended June 30, 1915. *Inter alia*, Mr. Saner writes:—The results for the year are as follows: 218,453 tons of ore were crushed, yielding from all sources, £225,413 14s. 7d., or £1 0s. 7·647d. per ton; expenditure for working expenses, £213,825 9s. 8d., or 19s. 6·916d. per ton; profit from working, £11,588 4s. 11d., or 1s. 0·731 per ton; add claim and township licences, rents and sundry revenue, £10,805 4s.; total profit for the year, £22,393 8s. 11d.

Milling.

During the financial year under review 60 stamps ran 337·117 days, crushing 218,453 tons, or 10·8 tons per stamp per 24 hours. The average value of the ore milled was 4·896 dwts. per ton, and the gold won by amalgamation was 16,334·576 fine ounces, or 30·54 per cent. of the screen value and 31·53 per cent. of the total production. Three tube mills ran 241·077 days, producing 14,928·930 ounces of fine gold, equal to 28·82 per cent. of the total product.

Mining.

The total tonnage mined during the year was 284,362 tons, including 5,678 tons hoisted as waste. In addition, 6,998 tons were taken from the surface dumps. 68,750 tons waste were sorted out on surface, equal to 24·07 per cent. In addition to the waste sorted out on the surface, it is estimated that another 4·26 per cent. was packed underground. Of the tonnage mined 187,301 tons (65·87 per cent.) came from Main Reef stopes; 49,244 tons (17·32 per cent.) from South Reef stopes; 27,991 tons (9·84 per cent.) from Battery Reef stopes; and 19,826 (6·97 per cent.) from development.

Shaft Sinking.

No shaft sinking has been done, owing chiefly to the water troubles experienced due to the excessive rainfall. Arrangements are well in hand to sink the Windsor incline immediately. A re-estimation of the ore reserves at the 30th June last shows that there were developed some 702,123 milling tons of an average assay value of 5·30 dwts. per ton, and 736,482 tons of an average assay value of 3·31 dwts. per ton. This shows an increase of 41,758 tons in ore reserves while the average grade is ·19 dwt. lower. The reduction in value is due to fluctuations in stope face values at the end of the financial year when the reserves were re-calculated.

FULLY DEVELOPED—PAYABLE.

	Eastern.		Western.		Total.	
	Tons.	Dwts. per ton.	Tons.	Dwts. per ton.	Tons.	Dwts. per ton.
Main Reef	60,974	4·96	519,958	5·36	580,932	5·32
South Reef	85,596	5·21	—	—	85,596	5·21
Battery Reef	19,440	5·18	16,155	5·27	35,595	5·22
	166,010	5·12	536,113	5·36	702,123	5·30
UNPAYABLE.						
Main Reef	155,661	3·30	532,847	3·29	688,508	3·29
South Reef ..	10,635	3·80	—	—	10,635	3·80
Battery Reef	—	—	37,339	3·45	37,339	3·45
	166,296	3·33	570,186	3·30	736,482	3·31

In addition from areas partially developed there were indicated at the western section 29,637 milling tons Main Reef of an average assay value of 5 dwts. per ton, and 171,687 tons Main Reef of an average assay value of 3.7 dwts. per ton, and 30,600 tons South Reef of an average assay value of 5·2 dwts. per ton. 10 per cent has been deducted from all totals for faults, pillars and dykes.

Plant.

The following additions to plant were made: Completion of two tube mills and equipment; headgear and haulage lines for east battery reef; two water tanks purchased from Lancaster and erected; new assay office; additional pulveriser for sampling house; one mule, trap and harness; ambulance stretcher for Windsor; installation of new compressor commenced; excavations commenced to instal new pumps at 20th level vertical shaft.

General Review.

From the foregoing it will be seen that the tonnage milled has shown an increase over that of last year, due to the larger tube mill equipment. The actual recovery, excluding accumulated slimes, was 4·743 dwts., or 19s. 10·566d. per ton, and the working costs were 19s. 2·327d. per ton, a slight increase over those of last year, due to increase of cost of stores because of the war, and extra hoisting and pumping charges owing to influx of water consequent on the excessive rains during the early part of this year. All repairs, renewals, shaft sinking and general upkeep of plant have been charged to working costs, as well as the contributions to the phthisis compensation and insurance funds. Average number of whites underground, 107; average number of whites on surface, 101; total, 208. Average number of natives underground, 1,223; average number of natives on surface, 243; total, 1,466. The average monthly complement of natives was 1,528. A considerable amount of work has continued to be done on the upper levels with fair results. Of the ore milled, 35·58 per cent. came from the east (Windsor) section; 52·70 per cent. came from the western section; 11·72 per cent. came from the battery reef (east and west). The value of the Main Reef continues low but of good width on the whole, though the payable areas are affected by faults; the South Reef remains the same, viz., thin and erratic in value. The Battery Reef west continues to be faulted, while the Battery Reef east is also disturbed, only the probable areas of high value which are indicated in surface prospecting should make this section of great importance.

Projected Underground Work.

West: Drive 8th, 10th, 12th and 14th levels east on Main Reef towards the main fault dividing the west from the Windsor sections. Tap the South Reef in places on these levels. Push 21st west drive to the western portion of the property towards the Lancaster boundary and so open up the rich chute intersected on the 20th level. East: Sink the main incline and drive levels east through the French Rand fault to open up the eastern side of the mine. Battery Reef east: Sink small vertical shaft to 3rd level and drive 1st, 2nd and 3rd levels west and 2nd and 3rd level east. West mine, Main Reef: Prospecting has been continued on the upper levels and small blocks of payable ore have been mined. 10th level east drive was continued along the main north east diagonal fault, and detached parts of reef were intersected but were disappointing in value. This area appears disturbed, at present we are driving on a narrow band of low value. There are indications that the country is getting more settled as the drive is being continued east. 12th level east continued low in value and narrow, a large fault was intersected and the reef is being prospected for. A rise to the 10th level was very good for 165 feet, but after being faulted up about 30 feet it is so far disappointing in value. The winze between 12th and 14th levels was connected and is of good value over about 500 feet. 14th and 15th levels east have been of good value, but the reef is narrow. Connections between 14th and 15th and 15th and 16th levels have been made on this good section. Development on 17th and 18th levels (north section) has been erratic; the necessary rises have been put through. 21st drive east struck the main fault and has been stopped. 21st drive west: little progress has been made on this level owing to water troubles, a very strong stream having been cut. The values going west of this are encouraging. West Mine, South Reef: This reef has been intersected and driven on in various levels from 5th to 21st, and as mentioned in last year's report the reef is narrow and erratic in value, but the prospects are encouraging especially on the 21st level, which continues highly payable. East (Windsor) Mine: Rises and winzes have been put through to develop areas from 3rd to 16th levels, but with only fair results on both Main and South Reefs. 15th level west on Main Reef is good in value and a wide body. 16th level west continues disappointing. 16th level east: The South Reef is rich but much faulted, while the Main Reef is poor. Battery Reef West: 1st level west has continued to give most encouraging values. 2nd level west winze has disclosed a wide payable body. 3rd level east struck several large faults and so far the values are poor. Battery Reef East: During the year the old workings were cleaned up and made safe, the small vertical shaft put into thorough repair. A hauling engine, headgear crusher, and mechanical haulage electrically driven, connecting with the Windsor tramline, were erected and stoping commenced. A pipe line to convey compressed air from the Windsor to this mine is being laid down. This will greatly expedite development. 1st level west was started, the values being erratic; there is a large body of reef exposed. A winze on the east is giving most encouraging results. 2nd level west was started up by hand and is payable, while on the east drive the reef is cut off by a fault which points to a "throw" of some considerable dimensions. A rise and winze to connect 1st and 2nd levels west is well forward.

GENERAL.

The treatment of accumulated slimes gave a profit of £4,088 16s. 4d., or 5s. 7·864d. per ton treated. This is very satisfactory, especially as the abnormal rains during the season made transport very heavy and the treatment of a portion of the slimes impossible. The electrical pumps at the south vertical incline, and those in the Windsor shaft have done good work throughout the year, but were severely taxed during the flooding rains, and baling at all shafts had to be undertaken to supplement the pumps and save the mines. An extra pump and duplicate pipe line is being put down at the 20th level, while an electrical pump is being installed at the shaft bottom to handle the water recently struck in 21st level west. Every attention continues to be paid to dust allaying and ventilation of the various sections, as well as to the sanitary conditions both above and below ground. The health of all employees, both white and coloured has been excellent. The plantations continue to supply good timber for all mine purposes. About 50 acres were ploughed up during the season, 18 of which have been planted with trees. Every effort is being made to run all underground operations on day shift only, and when the extra compressor is working this will be carried out.

Neumann Group.

The following are particulars of the results achieved by the crushing companies of this group during last month, and officially supplied, viz.:—

	TONS.	YIELD.	PROFIT.
Witwatersrand Deep ...	43,850	£55,356	£16,050
Wolhuter	35,600	43,500	13,920
Consolidated Main Reef ..	29,130	42,022	13,934
Main Reef West	26,520	28,276	3,839
Knight Central	29,020	31,557	4,053
Total for group ...		£200,711	£51,796

Carbide Lamps in Mines.

A type of open-flame cap lamp for burning acetylene gas, the gas being made within the lamp by the action of water on calcium carbide, and known to miners and the trade as "carbide lamps," has come into use in metal and coal mines of the United States in recent years. In some non-gaseous coal mines the open-flame oil-lamp, and in many metal mines the candle, has been replaced by this lamp. Fully 300,000 acetylene lamps are in use in mines of this country, 60 per cent. in coal and 15 to 20 per cent. in metal mines being of this type. A carbide lamp gives better light than a candle or oil-lamp, and so should reduce the number of accidents; it is clean and the flame produces little smoke; the gases of combustion are principally carbon dioxide and steam, and the acetylene is not injurious to health; the flame does not drop sparks that might ignite explosives, but the flame will set fire to anything quicker than the flame of an oil-lamp or candle; the general efficiency underground is better on account of better light; and the cost of upkeep is lower than that of the other lights.—James W. Paul in *Miners' Circular* 18 of the United States Bureau of Mines.

Glynn's Lydenburg.

The following are the particulars of this company's output for the month of October, 1915:—Tons crushed, 4,178 tons, yielding 1,579·480 fine ozs.; estimated value of month's output, £6,614; estimated profit for the month, including £318 recovered from claims for loss of profits owing to floods, £2,754.

Brakpan Mines.

The following information is officially supplied in regard to the October, 1915, output:—Stamps working, 140; running time, 28 days; ore crushed, 64,000 tons; tube mills working, 10; ore hoisted, 72,522 tons; ore from dump, nil; waste sorted, 13·74 per cent.; fine gold declared, 21,390·50 ozs.; value declared, £90,038, equal to 28s. 1·64d. per ton milled; working costs, £56,927, equal to 17s. 9·48d. per ton milled; working profit, £33,111, equal to 10s. 4·16d. per ton milled.

Zaaiplaats Tin.

The Zaaiplaats results for the month of October, 1915, were as follows:—Days run, 30·6 days; ore milled, 2,574 short tons; residues re-treated, 2,475 short tons; concentrates won, 70 long tons; average value of concentrates, 70 per cent. metallic tin; estimated profit for the month, excluding Government taxes on profits, £1,953 0s. 6d.; deduct adjustments in respect of estimated values of previous shipments, £578 12s. 9d.; profit declared for the month, £1,374 7s. 9d.; capital expenditure, nil. Note.—The revenue for the month has been calculated on the basis of tin at £159 per ton.

WRIGHT'S ROPES.

SITUATION WANTED.

Wanted position as ASSISTANT ASSAYER. Knowledge of assaying, sampling and some experience of cyanide shift work. Willing to take temporary position.
"N.Z.," Box 4, Johannesburg.

ARGUMENTS AGAINST THE ROBINSON DEEP SCHEME.

Detailed Report of Mr. W. T. Birch's Speech.

The following is a full report of the speech of Mr. W. T. Birch at the Robinson Deep meeting last week:—In supporting the motion for adjournment, I must say I absolutely and totally disagree with the motion before this meeting to-day, and the chairman's statement regarding the proposed scheme (according to his reading) for our mutual benefit. It is certainly not too favourable for the Robinson Deep shareholders. In discussing this matter with some of the older shareholders, who came into this company when the shares stood between £4 and £4 10s., we are all agreed that it is unjust and unfair to amalgamate a well-equipped mine like Robinson Deep, with an up-to-date plant, valuable assets, and nearly four million tons of ore reserves, with unproved propositions, like Booysens Estate and South Deeps. I am unable, gentlemen, to find where the scheme emanates from. It is certainly not from the independent shareholders of Robinson Deep. There has been no mass meeting of English shareholders on Trafalgar Square, asking to be amalgamated with the South Deeps and Booysens Estate; neither has there been a public meeting of local shareholders on the Wanderers or Union Ground. As you know, gentlemen, the annual meeting of this company was held in June last. At that meeting your chairman stated "that there was every reason to believe that the value of the ore reserves would be maintained in practice during the life of the mine." I may state that the value of the ore mined in the past has resulted in an average profit of 10s. per ton, and the annual profits of nearly £230,000, and nearly four million pounds has been paid in dividends. Also during the past six months the meetings of the Booysens Estate and South Deeps were held—the two companies which it is presumed will control your affairs in future, as the Robinson Deep "B" shareholders. It will be perhaps instructive if I give this meeting the names of the gentlemen attending those two meetings. At the South Deeps: Present—Messrs. D. Christopherson, Brown, Kent, Rossiter, Honnet, Gill, Cowan, and White, representing 130,752 shares out of a total capital of £150,000. At Booysens Estate: Present—Messrs. D. Christopherson, Brown, Lynch, Honnet, Smit, Oldroyd, and G. C. White, representing 30,752 shares out of an issued capital of £35,698. Take particular notice of the fact that all these gentlemen (excepting Mr. Lynch of Consolidated Mines Selection, and Mr. Gill of Neumann & Co.) are employees of the Consolidated Gold Fields, Rand Mines, and Central Mining Companies. Not a single outside independent shareholder was present, and when you take the argument in your circular that strong financial houses had to be consulted, you naturally know at once who are the promoters of this proposed fusion—a most unfair and unjust proposition to this company, when you take into consideration the fact that Booysens Estate come into this scheme at £10 per share, or nearly nine times the value of Robinson Deeps to-day, and you are coolly asked to walk out at just over £1 per share as an "A" shareholder and receive payment of that £1 odd shillings spread over a period of 25½ years. The Turf Mines, with the same line of reef and at approximately the same levels, were compelled to come in to the Village Deep at 6s. per share. The division was ten Turf Mines for three Village Deeps. Many shareholders have the idea that they are absolutely guaranteed under the "A" share repayment clause, but they may be disappointed, as should the new claims prove unpayable, and should liquidation be decided upon at any time, the company, after paying the capitalised value to date, will only be liable for 1s. per share. The chairman states "that the estimated profits of the Robinson Deep as calculated by the consulting engineers are £1,740,000 in eight and a half years." Now, gentlemen, I will give you some idea of the assets of Robinson Deep, as stated in their last annual report. Total assets, after deducting sundry creditors, bewaarplaatsen, dividends, etc., just over £2,000,000; ore reserves, 1,878,000 tons, say, at 9s. per ton profit, roughly £900,000; add 82 unworked claims, average over 60,000 tons per claim, 4,500,000 tons of ore, and take the low estimate of £2,000,000 profit, make a total of £4,900,000. It is only fair to this meeting to give you the value of Booysens Estate and South Deeps from their balance sheet. Booysens Estate, less cash loan and sundry creditors, £59,000. South Deeps, less cash loan and sundry creditors, £149,300. The chairman states that our plant will be practically valueless at the end of 8½ years if we go on to a finish. Granted; but it will be worth at least half a million to the new company. The chairman knows better than anyone in this room that a battery of that size, including machinery, workshops, reduction works, quarters, etc., would not be erected to-day for anything like half-a-million pounds, leaving headgears, shafts, etc., out of the question, and yet we are asked to practically give this asset away. One of the points in which I consider unfair for the oversea shareholder is this: the short notice given of this meeting. You have complied with the law by giving sixty days' notice, but it is not enough for an important scheme like this. Many of our fellow-shareholders are to-day fighting our battles on the Continent in this great war, and it is impossible to give them a chance of carefully considering this scheme. The United States shareholders, also, are in the same position, and I am sure, sir, that your managing director of the Consolidated Gold Fields and the chairman of the Central Mining. Rand Mines in London do neither of them wish to rush this scheme through without all shareholders being given a chance to study it. Now, sir, I think I have given you a fair idea of my views on this matter, and would like the shareholders assembled to give their views also, and get you to abandon this idea of long deferred dividends to the Robinson Deep "A" shares, and come forward with a business-like proposition. Increase the capital of the company to a reasonable figure, not an excessive value, take over the Booysens Estate and South Deeps claims, and start developing the new areas at once. There is no need to shut Booysens or South Deeps out from dividends for 4½ years. Our dividends will be less, it is true, but we should be placed in a sounder position and still be twenty-shilling shareholders, instead of being compelled to go out of this company as one-shilling debenture holders. Now, sir, I have had the privilege of meeting you in company with the local shareholders on many occasions in connection with this matter, and must thank you for the courtesy with which we have always been received, but understand this, sir, we are not here to-day begging. We are only asking for our just rights in comparison with the value of our assets, and the only favour we ask of the Consolidated Gold Fields is common justice and British fairplay.

[The objections set out above were answered by the chairman at the special meeting, a report of which appeared in our last issue—Ed.]

New Heriot.

This company's return for last month's operations is as follows:—Ore milled, 13,800 tons; gold recovered, 5,730 ozs.; profit, £9,507.

City and Suburban.

The following are the results for October:—Ore milled, 28,400 tons; gold recovered, 12,106 ozs.; profit, £20,538.

MINING INSTITUTE.
TEACHING CENTRES:—{ JOHANNESBURG AND SCHOOL OF MINES, KIMBERLEY.
Prof. YATES prepares candidates for the following Government Certificates:—
MINE MANAGER'S.
MINE OVERSEER'S.
MECHANICAL ENGINEER'S.
ELECTRICAL ENGINEER'S.
MINE SURVEYOR'S
by Class, Private Tuition and Correspondence
SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - 60% ,,
MECH. ENGINEERS - June (Kimberly Centre) - - ALL ,,
MINE OVERSEERS - - - - - - - Practically ALL ,,
NEARLY 200 SUCCESSES. St. James' Mansions, Eloff Street.

PROGRESS ON BARNATO MINES.

Points from the Quarterly Reports.

The reports of the directors of the Barnato mines for the quarter ended September 30 give the following particulars:

Consolidated Langlaagte.

There was an increase of 6,200 tons in the quantity of ore milled as compared with the previous quarter. This was largely due to the considerable influx of native labourers which has been experienced generally on the Rand for some months past. At the Consolidated Langlaagte the total number of coloured labourers employed was increased from 3,046 at June 30 to 3,905 at September 30. This, combined with the increased cost of stores, had a direct effect on working costs, which, notwithstanding the higher tonnage, were increased by 6d. per ton. The grade was slightly lower, and the gross profit was £2,281 less than that for the preceding three months. The east incline shaft was sunk 52 feet to a total depth of 3,500 feet, and the west incline shaft was sunk 174 feet to a total depth of 3,142 feet. At the east shaft the 11th level station has been cut, and a crosscut started to the reef. At the west shaft the South Reef has been intersected at the 10th level, and driving on reef begun. At the point of intersection the reef showed a value of 15·5 dwts. over 26·5 inches. The development throughout the mine continues to expose reef of satisfactory value.

Ginsberg.

There was a slight increase in the tonnage crushed as compared with the previous quarter, and the recovery value of the ore showed an improvement of about a shilling per ton. Working costs were, however, ·457 shilling per ton higher, due for the most part to the increased cost of stores. Very little accumulated slime was treated owing to the longer treatment required by the current slime during the cold weather, and the consequent restricted capacity of the plant. The gross profit was higher than that for the preceding three months by £1,009. The ore developed during the quarter was of satisfactory value.

Glencairn.

There was a further reduction of 6d. per ton in the working costs, and the quantity of ore milled was increased by 1,800 tons as compared with the previous quarter. The recovery value of the ore crushed was 4d. per ton lower, and the gross profit showed an increase of £691. Of the total ore milled, 18,700 tons were obtained from reclamation and other sources, and the ascertained ore reserves were depleted by 47,180 tons.

Government Areas.

The recovery value of the ore milled showed an improvement of 3s. 7d. per ton as compared with the previous quarter, and working costs were increased by 2s. per ton. The tonnage crushed was practically the same, and there was an increase in the gross profit of £11,813. The development of the mine continues to expose ore of good value, and the payable reserves were increased during the quarter by 111,400 tons. In addition to the ordinary development, a considerable amount of work is being carried out underground in order to prepare the mine for the increased reduction plant which is now on order. The excavations for the additional plant are nearing completion, and good progress has been made with the foundations. Certain portions of the plant have already been shipped, and will shortly be arriving on the property.

New Primrose.

There was an increase of 2,850 tons in the quantity of ore milled and working costs were further reduced as compared with the previous quarter by about 5d. per ton. Unfortunately, the grade of the ore milled showed a further decline, with the result that the gross profit was reduced by £3,966.

New Rietfontein.

Mining operations ceased in August, and the entire mill was hung up towards the end of that month. There is a small quantity of accumulated slime remaining to be treated, and the slime plant is being kept in operation until this is disposed of.

New Unified.

The additional tube mill was put to work during the quarter, and the tonnage crushed was increased by 1,260 tons. Working costs were 5d. per ton higher, and there was a slight improvement in the grade. The gross profit was less than that for the previous quarter by £223. Steady progress is being made with the development of the South Reef, and some encouraging values have been exposed.

Van Ryn Deep.

There was an increase of 2,420 tons in the quantity of ore crushed as compared with that for the previous quarter. Working costs and grade showed only slight alterations, and the gross profit was increased by £1,273. The east incline shaft was sunk 93 feet to a total distance of 3,367 feet, and the west incline shaft was sunk 133 feet to a total distance of 3,977 feet. The main haulage north-east from the 7th level east shaft was advanced 339 feet, and has attained a length of 747 feet. This haulage is rendering available for stoping a large area of ground which has been proved by winzes to contain ore of exceptionally good value. The haulage will connect with the 5th level at a point about 1,000 feet from the eastern boundary of the mine. The driving of the 5th level east has been resumed, and has exposed reef of good value, and of a width considerably above the average stoping width of the mine. At the west shaft improved values have been exposed in the No. 1 winze from the 5th level west, and the seventh level is being driven in ore of high grade.

Witwatersrand.

The tonnage milled was 1,250 tons higher than the quantity crushed during the previous quarter. Working costs showed a slight increase, and as the grade was a trifle lower, the gross profit was reduced by £522. The southern incline shaft was sunk 201 feet to a total distance of 1,581 feet. The reef has been intersected in the crosscut at the 23rd level, the value at the point of intersection being 6·3 dwts. over 46 inches. Elsewhere development values are fairly satisfactory, and the payable ore reserves were increased by 6,600 tons.

The effect of the war upon the export of diamonds from the Union last year is clearly shown in the annexed figures: Union: Value, 1914, £5,514,778; 1913, £12,019,763; 1912, £9,155,367; 1911, £8,282,879. Transvaal output: Value, 1914, £1,162,031; 1913, £2,726,663; 1912, £2,386,979; 1911, £1,628,876.

GOLD MINE,

10 dwt. Proposition.

Large area, which can be developed into big mine. Already produced over £40,000 gold. A good deal of dead work already completed. Twenty stamp mill and cyanide plant on property. Good workmen's dwellings, stores, offices, and manager's house. Within 10 miles station, Transvaal. £15,000 working capital ample for the present. Parties prepared to find all or part of capital of proposed company, apply to N.T., care *S.A. Mining Journal*, Johannesburg, for particulars, stating whether desirous of taking active part in management.

THE VALUATION OF GOLD MINING SHARES.—III.

Present Value of an Annuity—Interest and Sinking Fund—A Brief and Simple Formula.

MATHEMATICIANS tell us that an annuity is a fixed sum paid periodically under certain stated conditions, and the present value of an annuity, according to the same authority, with which actuaries generally appear to agree, may be obtained by adding together the present values of each separate periodical payment. In obtaining the present value of annuities it is, furthermore, customary to reckon compound interest; the results obtained when simple interest is reckoned being contradictory and untrustworthy. The present value of £1 per annum for five years, at 4 per cent. compound interest is, therefore:—

Years.	Present value of £1 at 4 per cent.
1	·9615385
2	·9245562
3	·8889964
4	·8548042
5	·8219271
Present value of £1 per annum for 5 years	£4·4518224

It is interesting to note that the present value of the annuity may be found in another way. Suppose, for instance, that each annuity of £1 is left unpaid, until the end of the period of five years, and that it accumulates at compound interest. The amount of the first £1 and each succeeding £1 will thus be as follows; the last £1 being due and paid at the end of the period does not earn any interest:—

Amount of			With
1st year's payment ...	£1·1698586	...	4 years' interest
2nd year's payment ...	1·1248640	...	3 years' interest
3rd year's payment ...	1·0816000	...	2 years' interest
4th year's payment ...	1·0400000	...	1 year's interest
5th year's payment ...	1·0000000	...	Nil interest
Total amount	£5.4163226		

Now, £1 at 4 per cent. compound interest amounts to £1·2166529 at the end of five years, and since the present value of this latter sum is, of course, £1, the present value of £5·4163226 is $\pounds\frac{5{\cdot}4163226}{1{\cdot}2166529}$, or £4·4518224, or exactly the same quantity as was obtained by adding together the present value of each separate annuity of £1. It makes no difference then, as far as the present value of the annuity is concerned, whether we look upon it as being paid year by year, or whether we assume that it is to be left unpaid until the end of the stipulated period, provided compound interest is paid upon the outstanding instalments. In the latter case the person who contracts to pay the annuity is liable for the interest that has accrued; in the former event, he is not liable; but the purchaser may, for the purposes of the estimate of present value, be supposed to reinvest the payments himself. The point to be observed is, as has already been remarked, that the actual present value of the annuity is not altered in any way whatever by the assumption that the annual payments will be reinvested in order to re-produce the original sum.

INTEREST AND SINKING FUND.

It has been shown that £4·4518224 will purchase an annuity of £1 per annum for five years, at 4 per cent. compound interest. This annual payment of £1 may be divided into two portions, one representing the remunerative interest and the remainder the sinking fund, which as already explained, if reinvested, or left unpaid until the end of the period agreed upon, will amount to the purchase price, or present value of the annuity. Since 4 per cent. is the stipulated rate of interest, the interest upon £4·4518224 for one year will be £0·17807289, and the remaining sum of £0·82192710 will be the sinking fund, which is to reproduce the investment. Now, the amount of £1 per annum for five years, at 4 per cent. compound interest, is, as shown above, £5·4163226, and, therefore, the amount of £0·82192710 for the same period and at the same rate of interest, is £0·82192710 × 5·4163226 = £4·4518224, or exactly the sum paid for the annuity of £1. In other words, an annuity calculated on the ordinary basis provides for simple interest at a given rate upon the whole of the investment during the stipulated period, and yields a balance as sinking fund which, if invested at compound interest at the same rate, will reproduce the purchase price at the end of the same period. Put into actuarial phraseology, it may be said, then, that the annuity that £4·4518224 will buy for five years (or £1) exceeds the annuity that will amount to £4·4518224 in five years (or 0·82192710), by £0·17807289, the interest of £4·4518224 for one year. The same may be said, *mutatis mutandis*, of any other annuity calculated on the ordinary basis.

TWO RATES OF INTEREST.

It has already been pointed out, in a previous article, that although one might stipulate for a particular rate of interest upon an investment—or, as it might be called, remunerative interest—in accordance with the special degree of risk attached to the investment, it could not be assumed that the same rate would be easily obtainable for the purposes of a sinking fund, or, as a reproductive rate. Obviously then, if the sinking fund of an annuity calculated upon the ordinary basis were supposed to be reinvested at a lower rate than that demanded for remunerative purposes, the purchase price would not be reproduced at the end of the term of years. Those who look upon an annuity as comprising interest upon the money invested and a balance for the redemption on amortization of it, would naturally make an allowance for the new condition of things by paying a lower price for the same annuity. This is exactly what is done in the tables which are commonly prepared for the valuation of mining shares, and the result is, of course, that on this special basis an investor purchases an annuity for a lower sum than he would pay for the same annuity on what has been described as the ordinary basis.

FORMULA.

The relationship between the various factors just enumerated is briefly expressed by means of a simple formula, which is the basis upon which share valuation tables of different kinds are constructed. Let Pn = the present value of an annuity a. for n years; let r be the remunerative rate, and Mn the amount of £1 per annum for n years at the reproductive rate. The case we have presented may be expressed in figures thus:—

$$\begin{aligned}\pounds 4{\cdot}4518224 &= (\pounds 1 - \pounds 0{\cdot}1780729) \times 5.4163226\\ &= \pounds 0{\cdot}82192710 \times 5{\cdot}4163226\\ &= \pounds 4{\cdot}4518224\end{aligned}$$

Algebraically the process may be represented thus:—

$$\begin{aligned}Pn &= (a - Pn\ r)\ Mn\\ &= a\ Mn - Pn\ r\ Mn\\ \text{or}\quad Pn + Pn\ r\ Mn &= a\ Mn\\ \text{Therefore,}\quad Pn\ (1 + r\ Mn) &= a\ Mn\\ \text{and}\quad Pn &= \frac{a\ Mn}{1 + r\ Mn} \quad . \quad . \quad . \quad . \quad \text{I.}\end{aligned}$$

Dividing the numerator and denominator of this fraction by Mn we have

$$Pn = \frac{a}{\dfrac{1}{Mn} + r} \quad . \quad . \quad . \quad . \quad \text{II.}$$

Now, $\frac{1}{Mn}$ is the annuity which will amount to £1 in n years at the reproductive rate, and the calculation shown above may, therefore, be put in this way:—

$$\pounds 4{\cdot}4518224 = \frac{\pounds 1}{\dfrac{1}{5{\cdot}4163226} + {\cdot}05}$$

In this instance, the reproductive rate is the same as the remunerative rate of interest, but the same formula may be used on the case where the rates differ. The factor $\frac{1}{Mn}$ would be varied accordingly, and a simple calculation will make it evident that the lower the reproductive rate, the greater the factor $\frac{1}{Mn}$, or the yearly sum required to produce £1 in n years, and, therefore, finally, the smaller the present value of the whole annuity under consideration.

Crescens (Matabele) Mines.

The report of the Crescens (Matabele) Mines and Land Company, Ltd., for the year ended 30th June, 1915, shows a profit of £962. This, added to the balance brought forward of £751, makes a total credit balance of £1,714. Against this, however, have been charged £1,419 profit credited in last accounts in respect of land sold, the sale of which was subsequently cancelled owing to the purchaser being unable to complete the contract in consequence of the outbreak of war and its effect upon his financial position, and £272 depreciation in the value of Consols and sundry shares. The amount standing to credit of profit and loss account has thus been reduced to £22. Since the close of the financial year the Consols held by the company have been converted into £4,873 6s. 8d. 4½ per cent. War Loan. During the year 6,368 acres have been sold, namely:—On the Main Belt block 5,902 acres; on the Watershed block 466 acres; total, 6,368 acres, at a profit of £1,690. Since 30th June last a further sale of 8,452 acres on the Main Belt block has been effected, showing a gross profit of £2,274. The total area held by the company as at 30th June last was 479,451 acres. During the year under review 85 claims have, on the recommendation of the company's engineers, been allowed to go to forfeiture. These include 55 claims of which mention was made in the last report.

C. M. and M. Society.

The ordinary general meeting of the Chemical, Metallurgical and Mining Society of South Africa, will be held in the lecture theatre, South African School of Mines and Technology, Johannesburg, this Saturday evening, at 7.45 p.m. Paper for reading: "The Chief Sources of Accidents in Witwatersrand Mines," by Mr. Charles E. Hutton, Inspector of mines (member). Reply to discussion: "Notes on the Treatment of Antimonial Gold Ores from the Murchison (Transvaal) Range," by Mr. H. R. Adam. Final discussion: "Recent Investigations on Dust in Mine Air and the Causation of Miners' Phthisis," by Dr. James Moir. Continued discussion: (1) "Cyanide Consumption on the Witwatersrand," by Mr. H. A. White, and "The Prevention of Hydrolysis in Cyanide Solutions," by Mr. H. Leslie; (2) "Clean-Up Room Practice at the Simmer Deep, Ltd.," by Messrs. W. H. Jane and E. Davey (members). Excursions: A further circular will be issued to Reef members shortly, giving definite particulars of excursions to Vereeniging (December 4th) and New Transvaal Chemical Works (December 15th). Members outside the Witwatersrand area desirous of participating in these visits are requested to notify the secretary.

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Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

"Barnato" Group Quarterly Reports.

To the Editor, *South African Mining Journal.*

Sir,—With reference to the reports for the quarter ended 30th September, 1915, which have this day been issued to shareholders, I am instructed to announce that, in future issues particulars of development and values will be given. —Yours faithfully,

FRANK HALL,
For The Group.

Johannesburg, 13th November, 1915.

"African World" Red Cross.

To the Editor, *South African Mining Journal.*

Sir,—We intended to send by this mail and the next the souvenir badges and copies of the specially autographed photograph from Her Majesty the Queen of the Belgians. The badges are completed, but we received a message yesterday from Her Majesty, through her courier, Major Gordon, M.V.O., to the effect that, after further consideration, the Queen would esteem it a great favour if we would wait for another special photograph which she desires to have done to send to all friends in South Africa, whose magnificent response to the appeal for the children she appreciates most cordially and conveys her very grateful thanks, which will be sent in the form of an autographed message. This message is, we are advised, coming to us through the Belgian Minister. In deference to Her Majesty's desire, we have stopped the printing of the photograph we intended to send. All kind contributors will thus understand the reason of the delay, and if you could find space for this letter conveying the information given, it would be greatly appreciated. We feel sure in a few weeks from now the new photograph will be available, and no time will be lost by us in despatching 1,000 reproductions thereof to the kind contributors to our fund. Mr. John Raphael has left this week for France, and will distribute 15,000 garments and articles, the first consignment for the children, contained in 26 bales shipped by the Furness steamer Topaz, from Tilbury Docks some days ago. With compliments,—Yours faithfully,

For the "African World" Red Cross,
LEO. WEINTHAL,
Editor.

1, Gresham Buildings, Basinghall Street,
London, E.C.,
23rd October, 1915.

The British Motor Industry and the War.

To the Editor, *South African Mining Journal.*

Sir,—The following is the list of the officials of this association, and of the Committee of Management so far as it is at present constituted: Officers—President: E. Manville, Esq.; vice-president, S. F. Edge, Esq.; hon. treasurer, G. Holt Thomas, Esq.; secretary, Horace Wyatt, Esq.; Committee of Management: B. Caillard, Esq. (Wolseley Motors, Ltd.), R. Dennis, Esq. (Dennis Bros. (1913), Ltd., W. M. Iliff, Esq. (Sunbeam Motor Car Co., Ltd.), E. M. C. Instone, Esq. (Daimler Co., Ltd.), Charles Marston, Esq. (John Marston, Ltd.), J. Maughfling, Esq. (J. I. Thornycroft and Co., Ltd.), F. R. Sims, Esq. (Simms' Motor Units, Ltd.), Arthur Spurrier, Esq. (Leyland Motors, Ltd.), H. T. Vane, Esq. (D. Napier and Son, Ltd.), L. Walton, Esq. (Vauxhall Motors (1914), Ltd.). The Association is not in any way antagonistic to the great international organisation—the Society of Motor Manufacturers and Traders. On the contrary, the relations between the two bodies are entirely friendly and their objects do not overlap. The immediate objects of the Association are to safeguard the future of the British motor and allied industries, and to bring the influence of these industries to bear, with a view to securing that the goodwill of British firms shall not, under the existing exceptional circumstances, pass into the hands of foreign competitors. As you are aware, the great majority of manufacturers in the British motor and allied industries are at present wholly or partially engaged in the fulfilment of Government contracts, in view of which their ability to meet normal trade demands is greatly restricted, while in many instances it is impossible for any normal trade to be done. Meanwhile, the goodwill which has been built up by these firms during recent years is in danger of passing permanently out of their hands, and foreign competitors are taking full advantage of this opportunity. The importance of the British motor industry to the British Empire has been amply demonstrated by the services which this industry has rendered in connection with the supply of motors of all kinds for military use, and also in connection with the supply of munitions. The industry affords an admirable training ground for skilled mechanics, who can at any time of necessity be advantageously employed upon accurate munition work. It is highly desirable that the future of this great industry should not be jeopardised, and consequently manufacturers are co-operating with a view to ensuring that the serious position, with which they now find themselves faced, shall be fully understood by the public and properly represented to the Government. It is hoped that a full appreciation of the position will be reached not only by the public within the British Isles, but also in the Overseas Dominions and Colonies, and that general support will be given to the efforts of this important industry to safeguard its future to a reasonable extent, and to secure opportunities of trade not inferior to those accorded to foreign competitors.—Yours faithfully,

The Associated British Motor Manufacturers, Ltd.,
HORACE WYATT, Secretary.

Secretary's Office,
173, Fleet Street, London, E.C.,
19th October, 1915.

Telephone Troubles.

To the Editor, *South African Mining Journal.*

Sir,—I was much pleased to note your healthy criticism of the Telephone Department in your last week's issue, and certainly congratulate you upon your extreme tone of moderation. There is no department of the public service that is worse managed, and where the convenience of the public is less considered, than the Telephones. In the Witbank district the delays are damnable, although the department has been promising for years to remedy them, but have given no effect to any of their promises. It falls very heavily on business people that they should have to waste their time, which could be more profitably employed, in endless waiting for calls; besides which, from a revenue point of view, there is a serious loss of revenue entailed. While you are on the warpath you could not fail but do good if you gave them a very hard rub on these points, especially if it was worthy of being blazoned on the placard of your issue.—Yours, etc.,

"MINE MANAGER."

11th November, 1915.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

Surprise Gold.

In the accounts for 1914, now in issue, income figures for £705 and expenditure for £9,991, showing a loss on the year of £9,286. In 1913 the revenue was £729 and the expenditure £12,749, the loss being £12,020. The total debit on profit and loss account is now £49,430. The major portion of the adverse balance last year is due to depreciation and loss on machinery, plant, buildings, etc. Investments at cost stand in the balance-sheet at £80,356. At December 31st last there was a depreciation on the quoted shares of £42,153; the value of the unquoted shares was not ascertainable. The company retains its interest in the Eileen Alannah mine. Progress at Connemara is checked owing to the war.

Natal Coal Output.

The following output in tons of Natal coal has been notified to us for the month of October:—Natal Navigation, 29,697; Vryheid (Hlobane), 26,003; Dundee, 23,799; Durban Navigation, 23,093; Glencoe, 14,642; South African, 10,432; Hatting Spruit, 7,014; Natal Steam, 5,534; Wallsend, 5,175; Natal Cambrian, 4,913; Utrecht, 4,400; Fairleigh, 3,688; Newcastle, 3,438; Elandslaagte, 2,542; Vryheid Coke, 736; Avon, 449. Total, 165,559 tons, or a decrease of over 22,000 tons, as compared with the output of the previous month.

New Kleinfontein Quarter's Results.

The operations at the New Kleinfontein during the quarter ended September 30th, resulted in a net working profit of £69,589 (8s. 6d. per ton). The number of feet driven, risen and sunk (excluding shafts) was as follows: New Kleinfontein section, 4,849; Apex section, 1,220; footage sampled: New Kleinfontein section, 2,670; average mining width, New Kleinfontein section, 55 ins.; average assay value (mining basis), New Kleinfontein section, 5.40 dwts.; estimated tonnage of ore exposed by drives, etc. (mining basis), New Kleinfontein section, 141,595 tons. As the reef is not fully exposed by the drives in the Apex section, values will not be available until box holes are put in. The ore reserves at the end of the quarter on a mining basis were as follows: Payable, 2,849,732 tons; milling width, 57.36 ins.; value, 5.51 dwts. Unpayable, 1,269,987 tons; mining width, 51.90 ins.; value, 2.76 dwts.

South Africa and Base Metals.

When thinking of the mining revenue of South Africa the public generally has uppermost in its mind gold and diamonds. And very naturally so, for they constitute the bulk. But copper and tin are not altogether a negligible quantity, as the following figures of sales show:

	Copper.	Tin.
April	£230,689	£18,784
May	17,610	27,093
June	36,977	31,194
July	44,870	22,733
August	160,904	25,048

As regards copper the Cape Province accounts for the major portion—in August £125,278 against £35,626 for the Transvaal. The positions were reversed in respect of tin, the Transvaal being responsible for all but £48.

Printing, Bookbinding, Account Books, Tracing Cloth, Tracing Paper, Drawing Paper, Ferro Prussiate, Ferro Gallic, Indian Inks, Rubber Stamps, Stationery of all descriptions, Draughtman's and Surveyor's Requisites.
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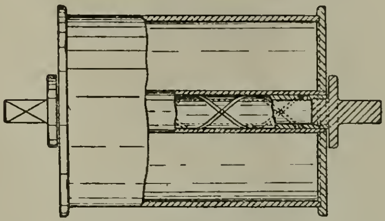
R. & M. SELF LUBRICATING
ROPE ROLLERS
ARE THE CHEAPEST
IN THE LONG RUN.



Requiring no attention they save money.

They reduce the wear on the rope owing to their light rotating weight and perfect lubrication.

Having square shanks they can easily be fitted into hardwood blocks.

ALL USUAL SIZES IN STOCK.

ROBERTSON & MOSS,
11-17, Trust Buildings,
Fox Street, Johannesburg.

THE WEEK IN THE SHAREMARKET.

Steady But Inactive—Balkan Uncertainty a Restricting Factor—Dividend Payers Firm.

BUSINESS has been on a much smaller scale this week, but prices remain firm. The prospect of good declarations after the publication of the November output has kept the quotations for dividend payers firm; but more speculative shares are easier. Some slight activity has been seen in the cheaper diamond shares, and tins have been better on the increased price of the metal. The Balkan uncertainty is obviously the restricting factor of the moment, and until the horizon clears in that quarter, business will doubtless remain dull.

	12th. Fri.,	13th. Sat.	15th. Mon.	16th. Tues.,	17th. Wed.,	18th. Thurs.,
African Farms	8 0	7 10*	7 9*	8 0†	8 0†	7 8*
Apex Mines	17 0*	17 0*	17 0*	17 0*	17 0*	16 9*
Aurora Wests	—	8 0*	8 6*	8 0*	—	—
Bantjes Cons.	4 0*	—	4 3*	4 3*	4 3*	4 3*
Brakpan Mines	66 0*	66 0*	—	—	64 0*	—
Breyten Collieries	—	—	—	—	20 0*	20 0*
Brick and Potteries	—	—	—	5 0*	—	5 0*
British South Africa	—	—	—	—	—	10 0†
Bushveld Tins	—	0 2½*	—	—	—	—
Cassel Coals	19 0*	19 0*	19 0*	19 0*	—	19 0*
Cinderella Cons.	2 9*	—	2 9*	—	2 9*	—
City and Suburbans	43 6†	43 6*	44 0†	44 0†	43 9†	42 6*
City Deeps	—	67 0*	—	—	67 0	66 0*
Cloverfield Mines	5 10	—	6 0†	5 11	5 9	5 7*
Clydesdale Collieries	13 6*	13 6*	—	13 6*	—	14 3*
Concrete Construction	2 6†	—	—	—	1 6*	1 6*
Cons. Investment	—	15 6†	—	—	—	—
Cons. Langlaagte	38 3†	38 3†	—	—	38 3†	—
Cons. Main Reefs	19 0	9 0	18 9*	19 0*	19 0*	19 0*
Cons. Mines Selection	10 6*	10 9*	10 9*	10 6	10 3*	10 3*
Coronation Collieries	25 0*	—	—	—	—	—
Crown Diamonds	—	—	—	1 9*	—	1 10*
Crown Mines	—	—	—	—	60 0*	68 9†
Crown Mines Debentures	£98*	£98*	£98*	£98*	£98	—
East Rand Centrals	3 0*	3 0*	3 1†	3 0*	3 0	2 10*
East Rand Coals	1 10*	1 10*	2 0†	2 0†	1 9*	1 9*
East Rand Deeps	1 3	1 3*	—	1 6†	1 3	1 3
East Rand Minings	6 6*	—	6 6*	6 3*	—	6 3†
East Rand Props.	22 0*	21 9†	21 6*	21 6*	21 9*	21 6*
Eastern Gold Mines	1 6†	1 5†	1 6†	1 6†	1 6†	1 5†
Frank Smith Diamonds	1 6*	1 6*	1 6*	1 6*	1 7*	1 7*
Geduld Props.	33 6	33 3	33 6*	33 3*	33 6*	34 0*
Glynn's Lydenburgs	10 6†	—	—	—	—	—
Goerz & Co.	—	—	12 0*	—	—	—
Government Areas	27 3	27 0*	27 3	26 9*	26 9	26 9
Jupiters	6 3*	6 0*	—	6 0*	6 2*	6 0*
Klerksdorp Props.	1 6*	1 6*	—		—	—
Knight Centrals	10 7*	10 9	10 10	—	10 3*	10 3*
Knights Deeps	—	—	26 0†	25 0†	23 3*	25 6†
Lace Props.	3 9†	3 9†	3 3*	—	3 3*	3 0*
Luipaardsvlei Estates	8 0*	8 0*	8 0*	—	8 6*	8 6*
Lydenburg Farms	5 6*	5 7*	5 8*	5 7*	5 8	5 7*
Main Reef Wests	7 2*	—	7 1*	7 3†	6 9*	6 9*
Main Reef West Debs.	—	£65†	—	—	—	—
Meyer and Charltons	100 0*	—	—	—	—	102 6*
Middelvlei Estates	1 4*	1 4*	1 4*	1 3*	1 3*	1 3
Modderfontein B.	119 6	119 0*	118 6*	119 0*	118 0*	118 0*
Modder Deep Levels	103 6	107 6	107 0	106 6	105 0*	106 0
New Boksburgs	1 0*	1 1*	1 0*	1 0*	1 0*	1 0*
New Eland Diamonds	8 0*	7 9*	—	7 9*	7 6	7 6*
New Era Cons.	7 3	7 3*	7 6	7 6	7 3	7 0*
New Geduld Deeps	2 6*	2 6*	—	2 6*	2 6*	2 7
New Kleinfonteins	24 3*	24 6	24 0*	23 9*	23 3*	23 3*
New Modderfonteins	310 0*	310 0ʌ	305 0*	303 9*	310 0†	307 6*
New Rietfonteins	0 3*	0 3*	—	0 3*	0 3*	0 3*
Pretoria Cements	—	—	—	46 9†	46 9†	—
Princess Estates	2 9	3 0†	—	2 6*	2 6*	2 6*
Rand Collieries	—	—	—	1 6*	—	—
Rand Klips	4 6	4 6	4 5*	4 3*	4 3	4 2*
Rand Nucleus	1 4*	1 4	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps	2 7*	2 9*	3 0	3 0	2 6*	3 0†
Randfontein Estates	12 3*	12 6*	12 6	12 3*	12 6*	12 0*
Rooiberg Minerals	14 0	14 3	14 9	14 3*	14 6*	14 6*
Roodepoort Uniteds	3 0*	—	3 3*	3 0*	5 0†	3 0*
Shebas G.M.	1 6*	1 6*	—	1 6*	—	1 6*
Simmer Deeps	—	2 3†	1 6*	1 6*	1 6*	1 6*
S.A. Breweries		32 0†	32 0†	—	—	—
S.A. Lands	—	2 7*	2 7*	2 7*	2 7*	2 7*
Springs Mines	28 0	28 0	27 9	26 9*	26 9*	26 9*
Sub Nigels	—	—	10 6*	—	10 0*	—
Swaziland Tins	—	—	22 0*	—	22 0	—
Transvaal Coal Trust	40 9	41 0	40 0*	41 0†	40 0*	40 9†
Transvaal Lands	—	11 0*	—	—	—	—
Transvaal G.M. Estates	27 0†	25 6*	26 0*	26 0†	—	—
Van Ryn Deeps	57 9	57 9	57 6	56 6*	56 9†	56 3
Vogel. Cons. Deeps	—	0 6*	—	0 9	0 8*	—
Western Rand Estates	1 6†	—	1 0*	—	—	1 0*
Witwatersrands	58 0†	58 0†	—	57 0†	56 6†	56 0†
Witwatersrand Deeps	27 9*	27 6*	27 6	—	27 3*	27 6*
Wolhuters	10 0*	10 3*	10 3	11 0†	10 3*	10 3*
Zaaiplaats Tins	11 6	12 0*	12 0	12 9†	11 6*	11 3*
Union S.A. 3¾ per cent.	—	—	—	—	£98 1 3*	—
Union S.A. 4 per cent.	—	—	—	—	£100 11 3†	—

* Buyers. † Sellers. ʌ Odd lots.

* Buyers. † Sellers. ʌ Odd lots.

PERSONAL.

Sir Leander Jameson, Bart., has returned to South Africa.

* * * *

We regret to announce the death of Mr. M. Torrente, Consulting Metallurgist to the General Mining and Finance Corporation, which took place this week. Mr. Torrente had a long and distinguished career on the Rand, and his death is a distinct loss to Rand metallurgy.

* * * *

Lord Winchester, Chairman of the Victoria Falls Power Company, and well known in South Africa, has been on a visit to London, after some months in the trenches in France. Major Bagot and Mr. A. E. Hadley, of the same company, are on the staff of the Minister of Munitions.

* * * *

Mr. Gordon Sandilands has resigned as a director of the Modderfontein Deep Levels, and Mr. B. H. Davis as a director of the Geduld Proprietary Mines, Ltd. Mr. H. C. Boyd, representative of the Central Mining and Investment Corporation, Ltd., has been appointed to fill the vacancies on the two boards.

* * * *

Mr. "Solly" Joel and the Hon. H. C. Hull paid a visit to Kimberley this week, and were the guests of Sir David Harris. Mr. Joel was fulfilling a promise made in the course of his speech at the annual meeting of the shareholders in the Consolidated Investment Company at Johannesburg the other day to visit Kimberley and Jagersfontein and confer with his colleagues on the directorates of De Beers and Jagersfontein Companies as to the immediate future policy of those concerns regarding mining operations.

* * * *

Concerning the late Mr. F. H. Whalley, " E.C.F." writes in the *Railway Magazine*:—" For the past two years his home has been at Mount Ngwibi, where he was a pioneer as general manager of Natal Ammonium, Ltd., and it was at this country settlement, some score of miles from Vryheid, that the sad event took place. Ever since the company started their enterprise in this spot hitherto unfrequented, rapid development has taken place, and the busy sound of steam and metallic clang of work with steel and iron has quickened almost unceasingly the quiet hillside, with but a weekly pause of Sunday rest. In that time the face of the countryside has changed. Giant structures of steel stand bald against the sky and background of the veld; buildings and habitations of men rise all about; and now he who was the guiding hand, the moving spirit in this scene of progress, has been swiftly removed. By his kindly manner and continual geniality, yet maintaining the authority that was his right, Mr. Whalley won great popularity and esteem, being admired as well for his constant pluck in struggling with great odds in ill-health, yet never resting from his labours though latterly sorely tried."

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Restarting the Diamond Mines—Acute Shortage of Boiled Linseed Oil—Prospects of New Industries.

The restarting of the Diamond Mines, more particularly the Premier, has been most favourably received throughout the Johannesburg commercial community. Under normal conditions, the monthly purchases, not only from a mining standpoint, but also from a shopkeeper's point of view, as the expenditure for household necessities, clothing, and such like, was a big item, considered directly and indirectly, for both Pretoria and Johannesburg. Therefore the restarting, even on a modest scale, will be very welcome, especially after the coming Christmas trade spurt of activity. The heavy rains of late, will, no doubt, have partly filled the workings at the Premier with water, but there is ample time to make that and other things ready at the mine by the first of next year. If perchance favourable war news had been received, in addition to the good news about the diamond mines, Johannesburg would have enjoyed a spasm of hopefulness, but, instead, some uncertainty exists in reference to Greece and the Near East troubles, which checked the first enthusiasm. The fact is that business is dull and sluggish on the Commercial Exchange, as the Mines, Municipalities, Railways and Government Departments have restricted purchases to their minimum requirements. The mines have stores on hand, and dividends will be coming forward in quick succession shortly and these mean a depletion of cash reserves, hence extra carefulness in buying until the turn of the year. Then again the Municipalities have been awaiting on a new set of councillors, and all Government Departments have been preparing for the new Parliament. Therefore, on the whole, it is not surprising that the wholesale merchants catering for big things are just now sustaining themselves on their past laurels. As regards prices, with the exception of brass, copper, and galvanised goods, all mining material is resting on present values, with the tendency to drop, as goods are coming on so freely, and sales in such cases have to be unduly pushed, otherwise heavy stocks would accumulate and drafts come due. One reason why goods are arriving so freely is that the majority of indents sent oversea were on the big side, as the idea prevailed that goods would be scarce; therefore by ordering more than was required a better chance of getting something seemed tempting, and now it appears that indents are being executed pretty much in full, although somewhat belated, hence a likelihood of over stocks, especially with less demand for the time being.

Rubber Goods.

According to cables the market this week was quite brisk in London for both rubber shares and the raw material. The price for Plantation rubber and Para was 2s. 9d. and 2s. 8½d., which is an advance of 6d. per lb. since October. In connection with this matter enquiries have been made locally, but little news could be obtained. It does not appear that the circumstances in London warranted any special cables to private firms here. This is explained by the fact that raw rubber is not dealt in here, but ordinary commercial rubber, as supplied to the mines and others, now costs from 4s. to 5s. per lb. as compared with about 3s. before the war. The agents here do not think the price will be much interferred with in Johannesburg, as stocks are fairly good, and the American competition is keenness itself to secure a big share in the South African market, especially for motor tyres and rubber goods in general.

South African Steel and Cement.

It is reported that the new enterprise of a Johannesburg foundry, making steel castings, bids fair to be quite a success. Mine managers and others interested are quietly visiting the works and inspecting the process, and all seem unanimous in their opinion that it is an industry which has come to stay, and, of necessity, must expand, as it is very handy to get a steel casting made locally and so save the time required to send oversea to replace breakages. Another industry which has made marvellous progress is that of cement. This has come into prominence recently owing to the shortage which has to some extent been relieved, as there is less urgency for Government orders for Cape harbour works, also the demand from local builders is not so strong. The heavy rains have checked supplies reaching here, as cement is an article very susceptible to damage through water and damp.

Electrical Goods.

Business continues very dull indeed. It has got into a hum-drum stage through lack of enterprise throughout the building trades, and there are no new blocks of shops to fit up with electric lights. Electric bells are scarce, with British taking the lead at 4s. 6d. to 6s. each; the Leclanche cells for same ranging from 2s. to 3s. each, according to size. It is interesting to remark that the American bells are slightly more expensive, because they are a little more ornamental and vary more than the British make, hence not so easy to get spare parts when necessary. The British makers keep to an exact standard, therefore doing away with any difficulty in case of renewals. On the whole, stocks are very fair, but all kinds of porcelain electrical parts are getting scarce, and practically no new supplies come along to supply wastage. Contractors complain sadly of the absence of new contracts, as very few are being put out now.

Acute Shortages and Advances.

One of the leading firms in the paint and colour trade here has quite run out of boiled linseed oil, which was anticipated in these notes in an issue of last month. It is hoped that this acute position (as boiled oil cannot be bought in any quantity in Johannesburg) will be relieved early next week, as consignments are already on rail from the coast. Another point in this connection is that caustic potash and caustic soda have risen from 3d. to 1s. 6d. per lb., the reason assigned being the extra demand in Britain for these chemicals for soap-making for the troops.

Second-hand Material.

There are several inquiries from the O.F.S. for boilers and engines for agricultural purposes and one from a co-operative creamery. A five-stamp battery has been sent to the Pilgrim's Rest district, and an inquiry has come to hand as to the cost of a ten-stamp battery for an antimony mine in the Pretoria district. The smaller sizes of engines and boilers have been absorbed to a very great extent, and now the producing mines only use such big machinery, there is little opportunity of obtaining small engines. A prospector's outfit was purchased this week for use just beyond Kimberley, in the hopes of following very promising indications already unearthed.

Miscellaneous Trade Notes.

All chemicals are fairly plentiful in Johannesburg, as a proof of this quotations are often less than in London, because the wholesale chemists sell from reserves, and during the time they last, quotations remain much the same notwithstanding the oversea fluctuations. Mercury has fallen to £16 per bottle, being a reflex of the London price of £14. The Congo copper mines are drawing supplies from Johannesburg, almost as a matter of course, through our having such large assortment of mining stores and the difficulty of obtaining them elsewhere. Owing to the rains quite a demand has sprung up for cultivators and ploughs, the most of which came from Canada, America and Australia. All new glassware has advanced 50 per cent., and second-hand brandy, as well as medicine bottles, have risen 150 per cent. since the war started. An advertisement appeared in a newspaper during the week asking for an expert who understands glass bottle making, which is an indication that a revival may take place in the South African glass industry.

REVISED PRICE LIST.

Approximate war prices, subject to quick change:—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle, 17s. 6d. to 18s. 6d. per 100 lbs; mild steel bar, 2¾d. lb; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7¾d. to 8d., 11 ft., 8½d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6¼d., 9 ft. 6½d., 10 ft. 6¾d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d. to 9¼d.; over, 9¾d. to 10d. (Oregon, 9⅜d.); flooring, 4½ x ⅞ and 6 x ⅞, 4⅜d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. 2d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £25 per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 21s. to 22s. 6d., boiled, 24s. per 5 galls.; white lead, 50s. to 52s. 6d. per 100 lbs.; turps., 43s. 6d. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 22s. 6d. to 26s. per 100 lbs.; dry oxide, 17s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, 18s. to 21s. wholesale, and 21s. to 27s. per doz. retail; Holland, 18s. to 21s. wholesale, and 21s. to 27s. retail; carbon lamps, 7s. 6d. per doz.; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.; tubing, 10s. to 12s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, nominal; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Great Britain Company.

Mr. A. A. Auret presided at the annual meeting of the shareholders in the Great Britain Gold Mining and Estate Company of Witwatersrand, Ltd., on November 16. In presenting the annual report and accounts for the year he pointed out that no work had been done on the company's property for the period. The revenue from the company's investments amounted to £1,000 18s. 5d., as compared with £1,654 11s. 8d. for the previous year, the decrease being due to decrease in claim licences. The report and accounts were adopted. The appointments of Mr. W. H. Betz to the directorate in place of Mr. J. L. Bilbrough (deceased) was confirmed, and Messrs. A. A. Auret and H. S. Lyons were reappointed directors. Messrs. G. M. Pemberton and F. W. Diamond were reappointed auditors.

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Engineering Notes and News.

CONFERENCE OF S.A. MUNICIPAL ELECTRICAL ENGINEERS.

Presidential Address by Prof. J. H. Dobson.

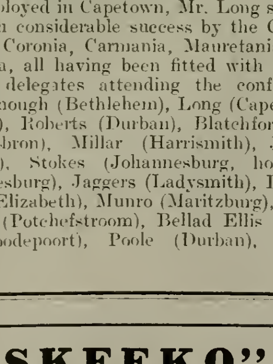
The Conference of Municipal Electrical Engineers was opened in the new Town Hall this week, Professor J. H. Dobson (the President), delivered his presidential address. Professor Dobson is the first President of the South African Imperial Electrical Engineers' Association. He expressed his gratification at the response to the suggestion that such an Association should be formed, and in this regard especially thanked Mr. John Roberts, of Durban, and Mr. Stokes, of Johannesburg. There were, he continued, many problems in municipal electrical engineering which required consideration, with special reference to the conditions which existed in South Africa. In the first place, in the absence of a body comparable to the British Board of Trade and Local Government Board, the newly-formed Municipal Electrical Association would be a body to which Municipal electrical engineering problems could be referred for expert advice connected with the spending of money for public undertakings. The Association might also be a body which might standardise electrical systems throughout South Africa, more particularly with regard to voltage and frequency of supply. In this way each Municipality would be able to buy in the best markets on thoroughly standardised materials such as lamps, motors, etc. Again, the question of electricity tariffs on a Municipal electric system was a problem peculiar to every public lighting system. An interchange of ideas as to how to deal with idle plant outside the hours of peak load, and suitable tariffs to obviate the necessity of increasing the number of meters was bound to result in advantage to every Municipality. Another question was that of meter reading. Some municipalities had water meters, electrical meters and gas meters, and as to whether there should be separate meter readers for each department or whether one meter reader should read all municipal meters at one stand or house, be they water or electricity meters, and whether the meters should be read during a certain period of the month or over the whole month, were certainly matters in which the public generally were particularly interested. The question as to whether electricity and water departments should introduce methods of advertising in various ways was also a matter well worthy of the consideration of Municipal engineers. Another matter which had doubtless occurred to many Municipal electrical engineers, especially in the large towns, was that of "licensing of electricians." In the case of Johannesburg, they had got to the stage of the Council having approved of draft bye-laws for the licensing of electricians, which bye-laws were now before the Provincial Administrator for his sanction. It was contended by many that the licensing of electricians upon reasonable lines and without any hardship to those who were *bona fide* electricians, would result in a greater protection to the public and a greater satisfaction to those in charge of Municipal electrical distribution systems.

TRAMWAY PROBLEMS.

Turning next to the question of Municipal tramway undertakings, with which South African Municipal engineers were often closely associated, there were many problems in this country which were essentially different to those in other countries. In the first place, there was the question of "white" versus "coloured" people, and the controversial points connected therewith. Again, there was the question of the Postmaster-General's requirements in connection with the return circuit of electric tramways. In 1911 an Act was passed entitled "The Post Office Administration and Shipping Combinations Discouragement Act, 1911," giving the Postmaster-General power to insist upon the introduction of the British Board of Trade Rules. There were many cases in which such rules, if insisted upon, would retard tramway progress, and he (Professor Dobson) could conceive of no better method of dealing with points of controversy on this subject than by their being discussed before this Association. To make this point quite clear, there might be required in some part of South Africa a tramway extension through a suburb where there was no telephone reticulation or other underground works. He submitted that in such cases the cost of the tramway scheme should not be burdened with capital to comply with rules unnecessarily, but that the dangers of interference with existing underground works should be the guiding factors, and not stereotyped rules and regulations. Another matter connected with the provision of tramways was that of extensions to the more sparsely populated suburbs of a large town, as well as the initiation of tramways for small towns. Various municipalities had embarked on systems to obviate the large capital expenditure of the ordinary tram car on steel rails; such systems were those of railless electric traction, and petrol, petrol-electric and electric omnibuses. It would be of immense public interest if those who had figures on the various systems referred to would present them to an association of this description for comparison and discussion. Owing to the different conditions it was impossible to accept home figures. No doubt many other subjects for discussion would occur to them, but he thought that enough had been said to indicate the lines upon which the Association might prove of great value to the municipalities and public life of South Africa.

On the motion of Mr. Dod, seconded by Mr. Sankey, a hearty vote of thanks was passed to Professor Dobson for his address. The conference then heard some notes on the prevention of corrosion in condenser tubes, by Mr. W. Long, of Capetown. Speaking of the Harris-Anderson system, which was employed in Capetown, Mr. Long said that it had been used with considerable success by the Cunard Steamship Co.; the Coronia, Carmania, Mauretania, and the ill-fated Lusitania, all having been fitted with this protective device. The delegates attending the conference are:—Messrs. McDonough (Bethlehem), Long (Capetown), Swingler (Capetown), Roberts (Durban), Blatchford (Greytown), English (Heilbron), Millar (Harrismith), J. H. Dobson (Johannesburg), Stokes (Johannesburg, hon. secretary), Price (Johannesburg), Jaggers (Ladysmith), Dod (Pretoria), Sankey (Port Elizabeth), Munro (Maritzburg), Castle (Oudtshoorn), Ross (Potchefstroom), Bellad Ellis (Queenstown), Mortimer (Roodepoort), Poole (Durban), and Leonard (Standerton).

"SKEFKO"



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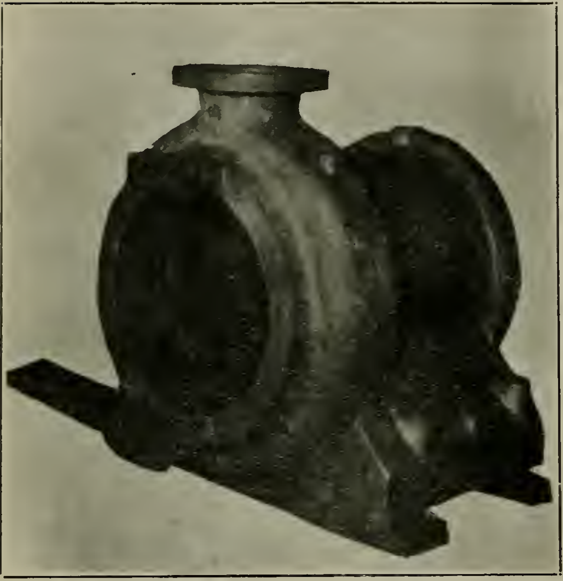
Big Bronze Casting.

During the present agitation in favour of local industries, and the appeal of the Government to South African people to help themselves more, and not depend on the Old Country for everything they need, it is refreshing to have brought to our notice, a casting calling for special comment. The casting in question is a pump chamber (cast in bronze) for a 60,000 gallon pump, tested to 600 lb. per square inch, weighing in the rough, as per illustration, 3.800 lb., which is the heaviest bronze casting ever made in South Africa. The firm who made this fine piece of work, the Standard Brass Foundry, Benoni, are equipped with a most modern plant, capable of casting a 3-ton job ,and are manufacturers of every class of pump work, and would be pleased to answer any enquiries. We are sure there are many engineering firms in the country. thoroughly equipped, who will be able to turn out anything needed in the engineering line if but given an opportunity to compete with imported articles. South Africa is altogether too dependant on Overseas supplies, while our own local industries are languishing, many not working at their full capacity. Further, the young men are given no chance to learn trades, which would, in time, make South Africa not only independent of Overseas supplies but possibly an exporter, as we have the raw material here in greater abundance than any other country in the world.



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South African Export.

Heretofore the accounts of the South African Export Company have been made up to the end of September, but to suit the convenience of the South African branches it has been decided to close the company's financial year on June 30th. This course is followed upon the present occasion; so that comparisons with the previous twelve months are impracticable. The net profit for the nine months covered amounted to £12,760, from which is deducted the debit balance of £2,504, leaving £10,256. It has been decided to replace the amount taken from reserve account last year (in order to meet in part the losses incurred in last year's accounts) to the extent of £4,000, and have written off goodwill £2,000 and off freehold property—South Africa—£258, leaving a balance of £3,999. A dividend of 10 per cent., free of tax, is recommended, leaving £1,599 to be carried forward. For the twelve months to September 30th, 1913, the distribution was 8 per cent.

* * * *

Stuttaford's War Prosperity.

Some firms have actually made money out of the war. The advance details of the trading of this South African drapery house of Stuttaford and Co., for the year to 31st July, indicate that, though the whole of that time has practically coincided with the war period, business has been of an exceptionally satisfactory character. The gross profit amounts to £63,100, which is £12,000 more than in 1913-14, and is actually the second best in the history of the concern, the only other occasion on which it has been exceeded being 1902-3, when the figure was £73,500. The Ordinary dividend is raised from 7 to 10 per cent., a rate not paid since 1903-4. The reserve gets £15,000, as against £10,000, making the total of the fund £35,000, and £25,400 goes forward, as against £19,500 brought into the accounts.

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NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 2d.

CONTENTS.

PAGE

Notes and News 285

Topics of the Week:

Recruiting and the Mines 287

Holidays for Mine Workers 288

Mining Prospects of German East Africa 289

Holidays for Mine Employees 291

Coal Prospects on the Karoo 292

Position and Prospects of Fraser & Chalmers 294

The Problem of the New Rand, Ltd. 295

The Position of the Nigel 296

Progress on the Neumann Group 297

The Outlook for Zaaiplaats Tin 293

Correspondence and Discussion: " Rooiberg Tins "; " Robinson Deep Scheme "; " Mining and Share Valuation " 298

Mine Safety, Sanitation and Welfare Bulletin:

A Year's Mining Accidents 299

The Week in the Mining Material and Engineering Trades 301

Company Meetings: New Modder; Nourse Mines; Glynn's Lydenburg: Apex Mines 303

Engineering Notes and News:

The General Garage 308

Preparation of Large Type Boilers for Test—III. 310

Notes and News.

New Modder and Nourse Mines. Another excellent statement was laid before the fortunate shareholders in the New Modder at the annual meeting this week. All the good things predicted for the company by Mr. Schumacher last year have come true, and the outlook was never better than to-day. Mr. E. A. Wallers, the new Chairman, was in the pleasing position of being able to satisfy shareholders on all points, and to promise no diminution in dividends while the bill for the new equipment is being paid. Mr. S. C. Black and Mr. J. Andrew Cohen exhausted laudatory adjectives in extolling the skill of the engineering and managerial staff, the success of the financial administration, and the good fortune of the shareholders in being favoured by nature with some of the best ground on the Rand. The New Modder, of course, is one of our " show " mines. Its record has been excellent from the start and its future bids fair to outdo even its brilliant past. The contemplated share-splitting scheme should make the shares more popular than ever, and enhance the interest of the investing public in the whole East Rand. The Nourse Mines reports an uneventful year. The speech of the Chairman, Mr. H. C. Boyd, together with that made by Mr. Wallers at the New Modder meeting, is printed in full in this issue. The Nourse Mines has still a long way to go, and much development leeway to make up before it can be said to be in a position to realize its possibilities. Mr. Boyd summed up the position exactly when he said: " Stoping widths have already been reduced somewhat, but the grade has not responded to the extent anticipated. This has been receiving the unremitting attention of the management and the consulting engineer for some time, and it is clear that we are not recovering the value called for from the ore so far mined this year. Efforts will be made to maintain our present reduced stoping widths which must favourable affect the recovery value of the ore mined, but from all that we can see it would be well not to count on any material improvement in recovery from the present reef exposures. In seeking for enhanced profits compared with those at present being earned, we must rather look to possible reduction in working costs, in which further concentration of the mine workings will be an important factor, but will take time to effect, and eventually to the development of higher grade ore in the newer portions of the mine."

* * * *

Witwatersrand Northern Exploration. An investigation of the Witwatersrand strata north of the granite in the neighbourhood of the Crocodile River, has been in progress for some time past, but details of the work so far accomplished are not at the moment available. The existence of the Lower Witwatersrand System at Swartkop is, of course, a geological fact, and the somewhat lively controversy that took place several years ago with regard to the correlation of the group of rocks in that neighbourhood, is doubtless fresh in the minds of most local geologists. The operations of the Columbus Syndicate along the further edge of the granite, and in the vicinity of Swartkop itself, were unsuccessful; but it has been since maintained that the boreholes that were put down to some depth on Louw's farm, not far from the eastern boundary of Kromdraai, were located in the beds of the Lower Witwatersrand System, and were, therefore, in a hopeless position at the outset. Unfortunately, the Witwatersrand System dips almost immediately under the overlying dolomite series to the north, and although there is no question as to the persistence of the older rocks below the overlying limestones, there is very little to go upon when one endeavours to draw conclusions with regard to the existence or locality of the Main Reef zone. As far as our present knowledge goes there seems no reason to doubt the presence of that zone in its proper place in the succession north of Swartkop, and on the assumption that the banket beds have their source in that direction, and are, therefore, likely to be more fully developed there, the investigation of the problem has its fascinating side. Only by means of boring, however, is the necessary information to be acquired, and this circumstance has doubtless been a deterrent to more active exploration in the past, as it must be a disadvantage in the undertaking that is now in hand.

* * * *

Union Oil Fields of S.A.

The movements of this company since its transformation from the Consolidated Oil Fields of South Africa, which took place a few months ago, have not been so prominently advertised as they were formerly. The obstacles to the raising of capital in Great Britain, which are in force at the moment have, doubtless, affected the operations of the concern to some extent. It is interesting to note, however, that Mr. Levy, who disposed of his rights in some oil shale farms to the company last year, in the vicinity of the Pongolabush, Natal, has returned to South Africa with Dr. Blair, an expert of some standing, with the object, we learn, of making a further examination of these properties, and possibly of some others, on behalf of the company. Previous reports were made by Mr. Cunningham Craig and Mr. Mills Davies, and a large quantity of the shale was sent to England for treatment in bulk, at the beginning of last year. The shale seams on the properties referred to are of fairly good dimensions, and it is doubtless desired to have further evidence before the properties are finally dealt with, in one way or another.

* * * *

Alluvial Tin Enterprise.

We are informed that the scheme for opening up alluvial tin areas on a large scale, by means of individual small workers, to which reference was made in the *S.A. Mining Journal* some weeks ago, is for the moment in abeyance, at any rate, as far as the particular property which was first occupied by peggers is concerned. The reason of this is said to be that the lode occurrences were found to be so much more important than had first of all been supposed, that it was considered more advantageous to postpone the alluvial scheme. Future operations are still under consideration.

* * * *

The Pyrite Market.

Attention has already been drawn by the *S.A. Mining Journal* to the demand for pyrite in South Africa. Recently, we have been informed, that at least 1,000 tons per month of this material could be disposed of to one company that uses it largely, at a figure of about 50s. per ton. The plant required for the treatment of pyrite ore would be of a fairly simple and inexpensive kind, and if a deposit carrying a satisfactory percentage of ore were obtainable the resultant profit should make pyrite mining an enterprise well worth looking into. The existing demand is one that is likely to increase, so that the present appears an opportune moment to investigate the resources of the country in this particular direction.

* * * *

Molybdenite.

Our occasional remarks concerning the value of molybdenite have had the effect of bringing to notice various occurrences of this mineral in various parts of the Transvaal. Deposits in the tin area have, of course, been known of for some years, but the trouble, we are informed, is that the percentage of molybdenite is usually rather low, something like 2 per cent. or so. Tin ores carrying less than 2 per cent. have been treated at a profit in the Transvaal, and it should not be difficult to make a profit out of an ore of similar grade which is at the same time several times more valuable. The flotation process of concentration, which is making great headway just now in other parts of the world, is eminently suitable for dealing with molybdenite, which is the most easily floated of all minerals. The difficulty with the flotation process in this connection, however, is said to be that it would not pay to put up a small plant, whereas a large establishment would produce more concentrate than could be absorbed by the market. However that may be, it should not be impossible to strike a happy mean in this problem, and the wide extent of the Transvaal deposits of molybdenite should be sufficient encouragement to engineers and metallurgists to take the matter in hand. As a matter of fact, experiments are being conducted here at present, we understand, with the treatment of the mineral by flotation processes. In addition to the usual vein occurrences in granite a large deposit of the mineral in sandstone has lately been reported.

* * * *

African and European Investment.

The annual report of the African and European Investment Company shows that in addition to its freehold land, representing a total area of some 1,069,869 acres, mineral rights are held over an additional 5,500 acres, while the ground owned by Bechuanaland Farms, in which the company now has an interest equivalent to about 61·6 per cent. of its issued capital, represents a total of 325,522 acres. The temporary absence of a large number of farmers on military service considerably hindered operations on the company's farms during the year, and it has been necessary to make some concessions to tenants, although no ultimate loss is anticipated. The receipts for rentals and farm revenue show no material alteration on the annual comparison. The company is considerably interested in the Far Eastern Rand through its holdings in the East Rand Mining Estates and East Rand Extension Companies, and, as our readers are aware, recent developments in this district have been consistently good. The directors express the opinion that the immense prospective value of the undeveloped portions of this area is undoubtedly becoming more fully recognised as time proceeds. In the centre of this neighbourhood is situated the property of the Grootvlei Proprietary Mines, in which a three-fourths share interest is held by East Rand Mining Estates. As regards the Rhodesian interests, attention is drawn to the considerably higher values obtained in the two lowest levels of the Lonely Reef Mine and improved profits from this property are anticipated. During the year the Vereeniging Estates Company redeemed at par £150,000 of the debenture bonds held by the Company, which has enabled the directors to reduce the liabilities by an equivalent amount. The company still holds £200,000 debentures of Vereeniging Estates as well as a large share interest. The year's operations resulted in a small loss, and the securities show a depreciation of roughly £138,000 on their book cost.

* * * *

United African Lands.

The directors of the United African Lands report for period to September 30 that the financial position shows material improvement upon the accounts submitted for many years past. The liabilities, which stood at £11,367 at September 30, 1914, have been discharged, whilst the sum due to be paid to the company for sales of land, etc., is now £8,315, as against £3,366, and is earning a good rate of interest. The cash balance also shows an improvement of over £300. It is estimated that the rents and interest for the next twelve months will amount to about £830. The revenue after a period of fifteen years—should at least be equal to the expenditure. During the period under review sales of land produced a net sum of £17,169.

* * * *

Secretary for Mines on the Diamond Outlook.

Speaking at the annual congress of the Vaal River Diggers' Union last week, Mr. Warington Smyth, Secretary for Mines, said he did not take a pessimistic view with regard to the diamond market. When the war began their chief market, America, was dislocated. American trade suffered severely, and credit had disappeared for the moment among the European nations. American trade was in a condition that the new war industries had not found their footing, and other industries were regretting the loss of their markets. To-day, American trade was on a new basis. They were producing war munitions at an unprecedented rate, while other American industries which had been languishing were steadily recovering. In the condition of the diamond market to-day they saw some measure of the prosperity which was rapidly returning to America. When the war broke out it was inevitable that at first there should be trade dislocation and great lack of confidence, but he believed they were now through with the great trade crisis, which affected their interest as diamond producers. He believed the symptom of De Beers and Jagersfontein starting on a small scale was a healthy sign, and he did not believe those diamonds would cut out their diamonds from the River. He thought the production of diamonds from the mines merely meant that the general trade was improving, and if the general trade was improving, he believed the prices for their stones would improve, because they knew theirs were the first in demand. He thought the future, so far as the diamond trade was concerned, was a hopeful one.

* * * *

Respirators and Dust in Mine Air.

At the last meeting of the Chemical, Metallurgical and Mining Society, the discussion was continued upon the paper read a few months ago by Dr. James Moir upon "Recent investigations on dust in mine air, and the causation of miners' phthisis." Mr. G. Hildick Smith (member of the Council) could not allow to pass without comment Dr. Moir's statement that "the very small size of the dust particles in mine air was the main reason why respirators were of little use as a protection underground." One way of preserving the health of underground workers was by means of an efficient respirator. There was a great difference between an efficient and a commercial type of respirator. From the latter the Miners' Phthisis Prevention Committee and the general public had apparently been led to believe that respirators were of no use. Mr. Smith suggested the employment of certain tests from the results of which an efficient respirator could be designed, so that underground workers might be assured that when systematically worn such a device would prevent them from acquiring miners' phthisis. He had worn many types of respirator—not the commercial type—and had tested many kinds in practice, and he was certain that his lungs would have been in a much worse condition than they were to-day had he not done so. In conjunction with Mr. Rusden, of the Ferreira Deep assay office, he had made some tests, the results of which were to his mind most important, and had a great bearing on the respirator question. But further research was necessary, and he believed that the final results would go to prove the fact that a dust-proof respirator was possible, and could be made consistent with comfort.

* * * *

"Use Water."

The Miners' Phthisis Prevention Committee has drawn up a diagram embodying some of the main results of its investigations regarding the efficacy of preventive measures in diminishing the quantity of the very fine injurious particles of dust inhaled by mine workers. It does not lend itself to reproduction in this form, but the figures given are striking enough in themselves, even without diagrammatic aid. This diagram is being posted up on all the Rand mines at the instance of the Chamber of Mines:—

Effects of dust-allaying on number of particles breathed per minute:—

Blasting.—	Millions.
*Five minutes after blasting cut: no water blast... ...	2.450
After using water blast for 30 minutes in drive	10
Drilling.—	
3¼in. Piston Drills:	
*Collaring, dry	125
Collaring, wet	57
*Drilling, dry	330
Drilling, wet, jet in hole	12
Drilling, watering with cup	28
Hammer drills (without water feed):	
*Collaring, dry	64
Collaring, wet	8
*Drilling, dry	18
Drilling, wet, jet in hole	9
Hammer drills with efficient water feed:	
Collaring	3
Drilling	6
Crusher-houses:	
Dusty conditions	31
Dust well laid	2
General:	
Dust-laden air entering drive after blasting in stope ...	1,770
Street dust (excluding visible) on a dusty day	2

The figures given above are the number of millions of particles of dust of 1/2,000 of an inch and less in diameter breathed per minute.

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* Work under these conditions is prohibited by law.
USE WATER.

TOPICS OF THE WEEK.

THE MINES AND RECRUITING.

Recruiting for the East African and Overseas Contingents remains the chief business of the moment; and to the excellent results of the past few days the mines have contributed no inconsiderable share. The difficulty, as we pointed out last week, is to reconcile the needs of the industry with the desire to release for active service as many men as possible. How generously the various mine directorates are fulfilling their obligations to those who go may be gleaned from two references made by chairmen of typical Rand mining companies at annual meetings held this week. Speaking at the meeting of the Nourse Mines on Wednesday, Mr. H. C. Boyd said: "In common with other mines, we have allowed all employees who can possibly be spared, irrespective of whether they have to be replaced, to join the military forces; 40 are at present on active service, and doubtless others will wish to respond to the call now being made for East Africa. As you are aware, the places of those who go with permission are kept open for them; up to half-pay is allowed to men who are married or otherwise have dependents, while single men without dependents receive quarter-pay. Much as we respect those who go on active service we must equally commend those who, often unwillingly, remain to carry on their important work of gold production: they have continued to subscribe in the most generous manner to the various war funds." Again, at the annual meeting of the New Modder, the new Chairman, Mr. E. A. Wallers, said: "The year's work has naturally been carried on under difficult conditions for the staff and the men on the mine. Many of our employees have been on active service in South-West Africa, are on active service in Europe, and I have not the slightest doubt are going on active service to German East Africa. Adequate provision is being made by the company for them and their dependents. Our gratitude is due to those men who are fighting our battles, and is also due to those men who wished to go on active service and could not be spared because of the national importance of the industry in which they are engaged, and who are so loyally carrying on their duties in many cases with added responsibility." On behalf of the industry as a whole, the last public statement on the subject was made by the President of the Chamber of Mines at the quarterly meeting of that body two months ago. Though the statement then made was intended to apply to the European Overseas Contingent we have no doubt that, *mutatis mutandis*, it may be taken to apply also to the East African Expeditionary Force. "When it was announced," said Mr. Dawe, "that South Africa would provide an Expeditionary Force it was decided by the gold-mining companies represented on the Executive Committee of the chamber that in cases where their employees volunteered for active service with the consent of their employers, their situations would be kept open for them, and that the married men would receive half-pay. More recently your Executive has had under consideration the case of single men without dependents. It was thought that the contingent should consist chiefly of unmarried men; on the other hand, it was felt that to men accustomed to South African rates of pay the Imperial rate of pay, of one shilling per day, offered insufficient inducement. Your Executive therefore decided that in the case of the volunteer being a single man, without dependents, he should receive quarter-pay, in addition to the present Imperial rate of one shilling per day, so long as that existing rate of pay continues. In regard to cases of single men having relatives dependent on them, no hard and fast rule has been laid down, but where such men have volunteered with the consent of the management concerned, their cases have been considered on their merits, and where the circumstances warrant it, an amount in excess of quarter-pay has been granted. It may be that when the new Union Parliament meets the Imperial rate of pay may be supplemented by the Union Government, in which case the question of the allowances made by the mining companies will be reconsidered. The number of applications which the mining companies have received from their employees for permission to volunteer for the Overseas Contingent has been large. In some cases it has not been possible to grant the permission asked for; and in regard to this point I may be excused for again referring to the fact that the importance of the mining industry to the Empire is so great that we can run no risk of interfering with its steady operation. An instance of the vital importance of the South African gold in the cause of the Allies has lately been in evidence through the heavy fall in the American exchanges. You will have observed from the Press cables that, while arrangements are being made for the establishment in America of sufficient credits to adjust the adverse balance of trade in regard to ordinary commodities, the large orders for munitions of war placed by the Allies will not be financed by the American banks, but will be paid for to a considerable extent in gold. The continuance of the necessary gold payments is only made possible by the fact that the British Empire produces sixty millions pounds sterling in gold per annum, thirty-eight millions of which is produced by the Transvaal." The same sequence of ideas, it will be seen, marks the public statements quoted from the speeches of spokesmen of the industry. There is the anxiety to make the recruiting campaign an unqualified success; the offer of most generous terms to those who volunteer, and the hint that, of course, all cannot go as the productivity of the mines, in the national interest, must not be impaired. How well the miners in Great Britain have behaved in the crisis—all talk about the South Wales strike notwithstanding—and how useful their special qualities have proved in the field may be illustrated by re-quoting some opinions from oversea. Thus, the record of the British coal miners is strikingly summed up by Mr. Lloyd George in his speech on the question of munitions delivered in the House of Commons on the 23rd June last, from which the following extract is quoted: " The way in which the miners have come forward to enlist in our armies voluntarily is one of the most conspicuous exhibitions of patriotic sacrifice that has been exhibited by almost any trade in the country. I believe that about 224,000 of them are enrolled in our armies at the present day, and I was told by men whom I have seen at the front that no men have exhibited more desperate valour under trying conditions than the miners who have come from different parts of the country." The work of the miner develops certain characteristics that peculiarly fit him for the trench warfare that has played so great a part in the fighting in Flanders. One officer, in speaking of the miner's battalion, stated that the miner made a good soldier because of his ability to withstand cold and damp and fatigue, because of his " strong back," his understanding of excavation and the nature of ground, his familiarity with explosives, his " curious ear " for suspicious sounds, and his general contempt for danger. This officer remarked that miners did not make " parade soldiers," particularly in the case of the older men whose figures were set, but he did not think that the Germans had noticed the difference. In the matter of listening the miner should excel, as under working conditions his life will sometimes depend on his ability to correctly diagnose the meaning of sounds in the roof and timbers. The conclusion of the whole thing is that only a very limited number of skilled underground men can be spared from the Rand. Other departments may contribute more in men-power, and the managements must be implicitly trusted to decide just who and how many may go upon the great and noble adventure, without injury to the industry.

HOLIDAYS FOR MINE WORKERS.

The splendid work being done by the workers of the Rand in helping steadily to augment the gold foundations of the Empire's credit in this crisis makes the announcement of a generous scheme of holidays for mine employees particularly happy and opportune. Full details of the scheme will be found in the official memorandum of the Chamber of Mines, printed in another part of this issue. It will be seen that the holidays to be granted the men in future are framed on most generous lines, and are far in advance of anything hitherto obtaining on the mines. It is a new and welcome sign of efficiency in high places that the whole question of holidays hitherto treated in a haphazard fashion, without any pretence of uniformity or permanency, should now, at last, be put on a sound unequivocal basis. Ever since the strike of 1913, when the employers, unsolicited, made an offer of an annual holiday on pay to the men, the question has been in the melting pot. Agreement and finality have now been reached on the subject by—at any rate—the members of the Chamber of Mines, and we shall be surprised if the Robinson group of mines—now again " ploughing a lonely furrow " outside the ranks of Chamber of Mines members—does not adopt a scheme at once so attractive and carefully thought out. The question of holidays is interesting and debatable. The first question to ask about them is whether they are necessary at all. Many people get on amazingly without them, and some of us have forgotten even what a holiday feels like. Claudius Clear, in his " Letters on Life," tells of an old lady who had a small business in Marylebone and never left it till she died. She was asked by a customer whether she did not sometimes wish to get away. The reply was that she had seen so much trouble and fuss about holidays, and had observed so often that they did harm instead of good, that she was quite satisfied with her situation. Dickens showed how the immortal Tim Linkinwater did very well in London, and would not leave it for any consideration. " I'm neither going to sleep in the fresh air: no, nor I'm not going into the country either. A pretty thing at this time of day, certainly. Pho! It's forty-four year," said Tim, making a calculation in the air with his pen, and drawing an imaginary line before he cast it up, " forty-four year next May since I first kept the books of Cheeryble Brothers." Indeed, when one thinks of the uncomfortableness of many holidays, of the disappointments in the weather, of the ineligible acquaintances made, of family resentments caused by overcrowding, of the defects of some lodgings and of some landladies, it may be seen that there was something to be said for Tim Linkinwater's choice. Dr. Robertson Nicoll also tells of an old minister who never during his life of eighty years took a holiday. He used to say, " When I take a holiday, I take it at home," and so he did. He slackened his work as much as possible, and gave his time to the pursuits that pleased him. But the race of non-holiday-makers is now nearly extinct, and there are medical men in Johannesburg who declare that their occupation would be almost gone if people here took more holidays at the coast. For the men who drag out existence amid the drab surroundings of the mines, and, more especially, for the underground workers, holidays are less a luxury than a necessity. In the fight against miners' phthisis, though we have no scientific opinion to go upon, it is generally held that more frequent holidays would play a useful part. The comparative immunity of the native worker from the disease certainly supports this view. Plainly, in this matter of holidays, liberality is the best policy, and the employers will doubtless be well repaid for their generosity by the presence of a happier and healthier body of employees on the mines. Supplementary to the grant of new holiday privileges, the mines are endeavouring to make special arrangements for the employees on leave to travel over the Government railways and to enjoy special facilities at the various chief seaside resorts. Though nothing definite has been arranged with the railways, we hope to see substantial concessions made to the mine workers of the Rand, who constitute, after all, the fighting line of the country's economy. The enormous revenue derived directly and indirectly by the railways from the working of the mines should be a constant reminder to the authorities of what they owe to the mining industry. The health and contentment of the workers in that industry are, therefore, not merely the domestic concern of the mines—they should be a national concern, shared by all. It is a truism that the whole economic fabric of the country is built upon the mines, and it is high time that recognition of the fact, though never in theory now denied, should be translated into some tangible concession to the workers in those mines. And, in a less degree perhaps, the same is true of the chief ports, which are also the chief holiday resorts of the Union. It is " up to " them to recognise and welcome the men in the forefront of the industrial fight, the men who risk being " broken in the wars " of industry; and to make their brief, annual visits to the coast as pleasant and healthful as possible. Clearly, all these benefits can be secured, sooner or later, by "taking thought"; and it is an entirely wholesome and refreshing sign of the times that the Chamber of Mines, on behalf of Rand employers, should be devoting so much time and attention to the business of improving the lot of the mine worker, on shift and off!

MINING PROSPECTS OF GERMAN EAST AFRICA.

Notes on Geological, Mining, Transport and Railway Conditions of the Country.

[By Oliver King, M.A.I.M.E.]

Considering the comparatively small portion of the country which it is possible to go over on such a visit as I paid in 1913, my conclusions are naturally not very final and authoritative. The area of the country is immense, and exploratory work has so far been very meagre, and very little is known of its mineral resources.

General.

Until twenty years ago the country was practically under Arab rule, and to-day the general environment is very oriental. The colony is now under a form of Crown Colony government. I found that exceedingly little interest is taken in the mineral possibilities of the territory. Speculation and enterprise have been almost entirely devoted to commerce, and the major portion of the business of the country is devoted to the native trade. Rubber and cotton plantations follow as the next important industry, and these are principally located on the coast belt traversed by the Tanga railway. Throughout the higher land of the colony practically all the easily cultivated ground is in the hands of the natives, who lead a very easy life. Their only need of money is for the payment of the small poll tax exacted by the Government. Away from the principal towns there are very few Europeans to be found.

Railways, etc.

Two railway lines are being built under concession to exploit the colony, the principal line being that from Dar-es-Salaam to Lake Tanganyika. This is being rapidly pushed on to tap the Belgian Congo trade. The railhead at the time of our visit was at Tabora, some 450 miles W.N.W. of Dar-es-Salaam. It was expected that trains would be running to the lake by the end of the year 1913, a total distance of about 600 miles from the coast. The second railway runs from the port of Tanga also W.N.W. to the southern slopes of Kilimanjaro, where it at present ends, a total distance of about 250 kilos. Away from the railway all transport is done by carriers. Present activities as far as gold mining is concerned, are confined to the country south and east of Muansa, on the southern end of Victoria Nyanza, and from 100 to 250 miles northwards of Tabora. Muansa is more easily reached via British East Africa, the route being by the Uganda railway from Mombassa to Port Florence, and thence by lake steamer. This is quite the best route to the gold-bearing country. Various other railway extensions, however, are spoken of in German East Africa, and may later form nearer routes, especially if the Tanga railway were extended to the lake, a distance of about 350 miles.

Route from the Transvaal.

This at present is very tedious and expensive. The East Coast boats take twelve days from Lourenço Marques to Dar-es-Salaam and fifteen days to Mombassa. The Uganda railway is 584 miles in length and takes two days to cover. On the lake the journey takes about three days from Port Florence to Muansa. Allowing for delays, for connections at Mombassa and Port Florence, the journey takes 20 to 30 days from Johannesburg, and the total cost per head runs from £40 to £50 first class. Before the war the German East African line were contemplating introducing a more rapid coast service, to make it possible to reach Muansa in from twelve to fifteen days from Johannesburg at a much less cost.

Roads, Transport, etc.

Roads with some few short exceptions, are little more than footpaths. The country is easy for road making, though making causeways over the swamps would be very costly. There is, however, practically no wheeled traffic, all the transport of the country being done by porters, so that roads wider than footpaths are not required. The question of transport is dealt with further on. The agricultural and commercial aspects of the country are beyond the scope of this article, and I shall now deal with the mineral resources of the colony.

Historical.

Owing to the difficulties of travel and inter-communication it is very difficult to get any clear and reliable information as to the mineral resources of the country and the exploratory work of the past. The earliest discovery of gold appears to have been that at Sekenke, some ten or eleven years ago. Sekenke is about 140 miles S.S.E. of Muansa and at least ten days' march from that port on Victoria Nyanza. It seems that natives brought in specimens showing visible gold, which a storekeeper named Gotze investigated. From this resulted the Centrale Afrikaanche Bergwerke Gesellschaft. The Kirondo Company is a subcompany of this corporation, which seems to have done much exploratory work, and to have extended their energies to a wider range of country. About this time, too, certain other expeditions appear to have gone over the country, and the occurrence of gold was proved at several points, though very little actual work was done, excepting at Sekenke. Active operations have been in progress there for the last four or five years, with a ten-stamp mill, firstly with indifferent results, but during 1911 and 1912 rich ore appears to have been met with and good profits were made. This richer ore appears to have been worked out to water level, and as the water cannot be coped with, the company, latterly, is said to have been working at a loss. To instance the difficulties of working, we were told that it had taken twelve months to get a boiler from Muansa to the mine, whilst heavy pumping plant was laying at Muansa, which it seems quite impossible to get through. From this it would appear that only rich ore can be made to pay, but the real truth regarding the position of the mine is very obscure, and any information regarding it is very unreliable. As regards the other points of interest where gold has been found, it would seem that most of these have been held by the C.A.B.G. About six days east of Muansa a small proposition is being run by one Zimmerman (late manager of the Kirondo Company). This had previously been equipped with a five-stamp mill by other parties, whose work was apparently unsuccessful. Zimmerman started to crush, but found it extremely difficult to carry on continuous work, and did not do enough crushing to prove the payability of the concern. These are the only points where active work is in progress in the country of late, though a few other claims are held, and some development work has been projected from Johannesburg. So far as I could see and learn, there is no evidence, so far, of ancient mineral workings such as have led to the opening up of practically all the mines in Rhodesia. Whether this was because the country was not accessible to the ancients, or did not afford them sufficient mineral promise I cannot say.

Topographical and Geological.

Passing westwards from the usual low-lying coast belt the country gradually rises to about 3,000 to 4,500 feet above sea level, and alternates between open country, bush, and swamp. Wherever the country is suitable for cultivation it is occupied by large numbers of Swahili speaking natives of varying tribes and nationality. The country is mainly gently undulating with rough granite ridges and occasionally schistose belts of hills. There are practically no perennially flowing streams, and the natives rely on water holes in the granite, which yield a small supply of turbid water. Large areas of country become swamp in the wet season, and the dry water courses become impassable rivers. After the rains the swamps dry up and the river beds become quite dry, or show only occasional pools along their courses. The dry season lasts from the end of May to November or thereabouts. Over quite the bulk of the country the only formation to be seen is the old gray granite, but there are large runs of schist with which are associated most of the gold discoveries made to date. Kuust (some time with Goerz & Co.) has written in Berlin on the mineralised country between Tabora and Muansa, and appears to have made considerable researches for the C.A.B.G. (or possibly for the Deutsche Bank?). Copies of his papers are not available in the country. I was not able to get to Sekenke, but so far as I could learn the ore occurs as lenses in diorite intrusions in the granite. Zimmerman's mine is on lodes in diorite schists. I could get no reliable information as to values, but I should estimate that the Kirondo Company were recovering about £5 to the ton when they were doing well, and that at present their yield is £2 to the ton. So far as I could gather, Zimmerman expected to recover about £3 per ton. The schist belt of Tkomam is said to be of great extent, and to probably extend northwards across the border into British East Africa. I met a planter in Mombassa who told me he had found gold on the British side, had prospected it, but found it had no sufficient continuity. The great range of iron stone schists in the Kahama district and west of the old Tabora-Muansa trail has not so far furnished any encouraging gold find. Remnants of stratified rocks are found occasionally, but generally the country only exhibits granite with the metamorphic belts described above. From the above notes it will be seen that only very sketchy information about the country generally is available, and that outside of a radius of 150 miles south and east of Muansa, no other districts have been located showing promising indications for gold prospecting. I was told that there is very likely looking country for prospecting in the Urundi district, east of the northern portion of Lake Tanganyika, but I could not get any definite information. At present the most promising area appears to be in the Ikoma district, at about fifteen days east of Muansa, and an expedition, to be out, say, six months, might locate good spots for further exploration. Such an expedition should preferably start from Shirati on the eastern coast of the lake, and work eastwards, and southwards towards Ikoma and Kilimafaze. Full equipments of mining requisites would have to be taken for the whole trip. The collecting of sufficient natives for both carrying and prospecting may prove a considerable difficulty and delay.

Prospecting and Its Difficulties.

Although there is an enormous area of country open to the prospector, there are very considerable drawbacks to be contended with, and these will, I fear, prevent any great influx of individual workers. The prospector will find that he cannot carry on work far afield from the railways without great expense and difficulty, in spite of the low cost of labour and food. In the first place there are practically no whites in the country, and all supplies have to be carried. Where the country is largely populated by natives, food for the porters, and certain requirements of the whites may be bought very cheaply, but outside of meal, fowls, eggs and meat, all supplies for the trip have to be carried. If operations are far removed from native settlements the difficulties are greatly increased. The frequent occurrence of belts of the Tsetse fly is the most serious obstacle to the development of the country, as animal transport is almost always out of the question, and the only resource is the bearer system. Automobile transport is also to-day out of the question owing to the nature of the roads, and the limited operations of the country. Difficulties with native labour meet one at every point. The tribes which furnish the porter class do not take to any other form of work, and it is extremely difficult to get natives who will act as porters and alternatively do prospecting or mining work if required. Wages paid to natives seem very small, but their efficiency in mining work is so low that their small pay is fully counterbalanced by the number required and by their unreliability for continuous service. No doubt in time, and if much mining work is done in the country, a better standard will be set up, but it will take long to educate the Swahilis out of the Oriental ideas of work now prevailing. Temperatures do not vary much, and the nights remain hot, especially in the rainy months, rarely dropping below 80 degrees F. As an instance of the comparative inefficiency of both European and native labour, I was assured that the Kirondo Company employ thirty to forty whites, and upwards of 1,000 natives to keep ten stamps running. A further difficulty for the prospector may be water. The distance between water holes may be great, and in the dry season it may easily happen that a prospector is many hours' march from the nearest water at which it is possible to use the dish. Except on a small scale at Dar-es-Salaam, mining supplies are practically unobtainable in the country. The assistance which the prospectors of Rhodesia obtain from ancient workings is absent.

Mining Difficulties.

Several especial difficulties may have to be met according to the situation of the ground to be worked. Water supply may be a great difficulty. There is practically no continuously running water, and so far as I saw, the country very rarely lends itself to schemes of water conservation. It remains to be proved what amount of reliance can be placed on underground sources. Timber, both for power and mining may or may not be easily accessible, but there is plenty of small timber available.

Labour and Transport.

I have already described how the difficulties under these heads will militate against economical work. Though none of the difficultits are insuperable, it will be gathered that there is very little prospect for low grade undertakings to-day.

Conclusions.

I was unable to cover anything like the extent of country which I should have liked to do, and the above notes apply only to the district to the south and south-east of Victoria Nyanza, in which the principal gold indications have so far been found. From the very scrappy information available there appear to be other districts in which indications have been found, and which may furnish payable mining ventures when more fully exploited. The country is 360,000 miles in extent, and will afford an immense scope for prospectors as conditions are ameliorated by fuller white setlement and development.

Hitherton instances of bravery in connection with rescue work in the Transvaal mines have been recognised in some suitable form by the Rand Mutual Assurance Company. The Executive Committee of the Chamber of Mines has now decided to take over this duty, and in future the Chamber will award a bronze medal to mine employees in recognition of acts of exceptional bravery. The medal is being designed in London, and will shortly be completed. In addition to this token of merit, it is also the intention of the Chamber to present the recipient with some gift, while the names of those who thus distinguish themselves are to be inscribed on a roll of honour.

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WRIGHT'S ROPES.

HOLIDAYS FOR MINE EMPLOYEES.

Transvaal Chamber of Mines Generous Scheme of Holiday Leave for Mine Employees (Other Than Officials).

The Executive Committee of the Chamber of Mines has approved of the following leave privileges for mine employees of companies members of the Chamber:—

Leave Privileges for Underground Employees.

Over Three Years' Service Underground.—Twenty-four working days on full pay, when such does not exceed 20s. per shift, which shall be the maximum pay during leave.

Between Two and Three Years' Service Underground.—Eighteen working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave.

Between One and Two Years' Service Underground.—Twelve working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave.

Leave Privileges for Surface Employees.

Reduction Works Employees (over one year's service).—Fourteen working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave.

Winding Engine Drivers.—Holiday leave for this class of employee is still under consideration; in the meantime, existing procedure to be followed.

Other Surface Employees (over two years' service).—Ten working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave.

The above holiday leave is in every case subject to the attached "Regulations Governing Leave for Employees other than Officials."

Regulations Governing Leave for Employees other than Officials.

1. Employees shall be granted leave privileges as set forth, provided they comply with the regulations governing the same.

2. All leave shall be subject to the convenience of the company.

3. Leave becoming due under these regulations shall not be accumulative.

4. Leave may not be claimed by any employee unless he shall have performed twelve months' continuous service on the same mine, or group of mines, if properly transferred within that group by written arrangement between the managers concerned.

5. Each period of leave granted shall be in respect to a complete and continuous period of twelve months' service.

6. "Continuous service" shall be regarded as having been broken when an employee resigns or is dismissed, or is absent without the permission of the management for more than three days in all in any three months, unless he furnishes on each occasion within three days of the date on which he first absents himself a doctor's certificate to the effect that he is or was unfit for work.

7. The period of service necessary to qualify for leave shall begin on the date on which the employee was engaged or became qualified for the last leave.

8. Time off in accordance with Regulations Nos. 6 and 13 shall not count as service, and shall not be included in the period of work necessary to qualify for leave, but the prescribed leave period itself shall be so included.

9. Application for leave must be made to the manager through the head of the department concerned.

10. Application for leave must be made before the expiration of one month from the date of the leave becoming due, and it shall be granted and taken within four months of such date. (Note.—During the first year in which leave becomes due under these regulations this period of four months may be extended to eight months in order to avoid congestion.)

11. Leave not taken as arranged for shall be considered to have been forfeited.

12. Leave granted under these regulations must be taken in one unbroken period.

13. The manager, at his discretion, may at any time grant or extend leave without pay.

14. Holiday pay shall be as follows:—

(a) Employees receiving day's pay only:—The amount being earned per shift (excluding overtime) at the time the leave becomes due, with a maximum of 20s. per shift.

(b) Employees receiving other than day's pay only:—The average earnings per shift during the six months immediately preceding the date upon which the leave becomes due, with a maximum of 20s. per shift.

15. Pay in lieu of leave shall not be given, and no employee who resigns or is discharged shall be entitled to any remuneration in respect of leave not taken. Such an employee may, however, elect to take a holiday upon the termination of his employment. In that event (unless he shall have been discharged for some flagrant breach of duty), and provided he authorises the employer to retain his record of service certificates for the period of leave prescribed for between one and two years' service for that class of employee, he shall receive holiday pay in accordance with these regulations from the date of the termination of his employment for the period during which he shall not have worked on any mine, but for not longer than the period of leave prescribed for the service of such employee.

16. An employee may be given a portion or all of his leave pay in advance at the discretion of the manager.

17. An employee who has been granted leave, with or without pay, shall not work on any mine during such period of leave, and any employee departing from this rule shall be considered as having broken the continuity of his service.

18. The manager shall retain the "Record of Service" certificates of each employee during absence on leave.

Notes.

1. For the purpose of assessing the amount of leave to be granted under these regulations, they shall be considered as being retrospective, but in no case shall leave which would have become due under them be regarded as having accumulated.

2. Time on active service shall count as service with the company for the purposes of leave privileges.

3. For the purposes of these leave privileges the strikes in July, 1913, and January, 1914, will not be considered as having interfered with "continuous service."

4. The General Manager of the South African Railways and Harbours has been interviewed with a view to the Railway Department granting facilities to mine employees in order to assist them in proceeding annually to the coast. The General Manager was extremely sympathetic, and is considering the matter.

The various Publicity Associations at the coastal towns are being approached with a view to obtaining information in regard to accommodation available in their respective districts, and the charges therefor. As soon as information of this nature has been received it will also be made public.

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COAL PROSPECTS ON THE KAROO.

Encouraging Results Obtained by Capetown Syndicate—Coal in Fissures—Search for Main Horizontal Seam—Possibilities of the Discovery.

The Karoo Coal and Development Syndicate, of Capetown, has recently obtained promising indications of coal in the Karoo. A series of analyses made by the Government Analyst, Capetown, of samples taken from various points on the Karoo Coal Syndicate property give good results. They are from fissures situated about five miles apart and at intervals along a strike of over twenty miles. The syndicate holds prospecting options for five years over 58,000 morgen, with the right for 99 years to remove the coal or other minerals on a royalty basis. The prospecting has been carried out quietly and on a sound basis; boring operations for the main horizontal seam are in progress, and, needless to say, upon the success of the latter, everything depends. In a report on the occurrence Mr. A. L. Chambers illustrates his theory as to the cause of the coal being found under unusual conditions. Some extracts from that report follow. Since the report was written a considerable amount of prospecting work has been done, which considerably strengthens the theories set forth in it, and gives evidence of the coal having been, partly by squeezing and partly by distillation, forced into the vertical fissures. About five miles to the east of the original and first occurrence discovered a line of fissuring with a north and south strike of over twenty miles has been located and coal proved at various points along its strike, while on the south end a consecutive strike of over 3,000 feet has been proved by prospecting shafts at intervals of 400 ft. Mr. A. L. Chambers concludes:—"We can therefore say to-day, coal has been proved to exist over a very large area, natural gas has been found by boring away from and independent of the fissures, at a point in between them. Consequently, I see no reason to change the opinion expressed in that report, and I feel from the results of the work done and the knowledge gained by frequent visits, confident that a strong seam of coal will ultimately be found to be underlaying that area."

Engineer's Report.

In the report on the occurrence of coal on the farm De Drift, Cape Colony, Mr. A. L. Chambers writes, *inter alia*, as follows:—

The Farm De Drift is situated in the Laingsburg District of the Cape Colony, the nearest railway station being Prince Alberts Road. which is 28 miles due south-east. The nearest town is Merweville. about nine miles north-east. at which place there is a post and telegraph office. The general surface of the country is undulating. with flat-topped hills typical of the Karroo veld breaking through it at irregular intervals. The farm itself is situated in what appears to be the centre of an enormous basin-like tract of country, with high flat-topped ranges of hills on all sides. The bold escarpment of the Nieuwveld is very prominent to the north. stretching away on the distant horizon to the east. Through this enormous basin or valley flow the Duyka and Oudeberg Rivers. which, however, for the greater part of the year appear as dry water courses. but in places where water remains in pools or natural dams, or accumulates from fountains or springs. there are found a few green trees. which. in marked contrast to the surrounding barren veld. enliven what would otherwise be a dreary waste of stony veld.

GEOLOGICAL FEATURES.

From personal observations. and from a careful study of the Cape geology. I would place the occurrence under review as being in the extreme base of the lower Beaufort beds or possibly in the Ecca Series of the Karroo system. The general geological features which are apparent on the farm are sandstones. into which has been intruded a large dolerite dyke. which dyke. I am of opinion, is responsible for a series of vertical fissures which strike parallel to the line of break caused by the dyke intrusion. In one instance the formation on the dyke side of the fissure has been raised about eight feet. the sides of the fissure are clean and sharp as though cut with a knife. while the hilltop shows a general levelling up of the surface by an overflow of igneous rock from the dyke fissure. Also contact metamorphism is very apparent in the rocks immediately contiguous to the dyke intrusion. The accompanying sketch plan shows an ideal section illustrating a theory of the disturbance which has taken place. of which there is abundant surface evidence on the Farm De Drift. A borehole has been put down about 100 feet in depth near one of the vertical fissures. from which an artesian spring is constantly flowing. which indicates anticlinal synclinal folding, of which there is no evidence on surface. but for the purpose for which it was intended the site of the hole is not well chosen—it should have been in settled country, and not in disturbed and broken formation.

OCCURRENCE OF COAL.

Several fissures have been located. These fissures strike apparently 20 degrees west of south to east of north. having, as far as can be at present determined, a distinct vertical dip. the sides of the fissures being clean and straight as though cut with a knife. at right angles to the stratification of the country rock. Into these fissures coal has been partly squeezed and partly distilled. Two of the fissures have been exposed on the almost vertical face of a hillside, showing a width of six to eight inches, the coal being much shattered and crumbling. In one instance it has been forced from the vertical fissure along the horizontal bedding planes of the formation for a distance of about 50 feet in a thin seam which gradually pinches out. These two fissures do not appear on the surface on account of a sheet of igneous rock overlaying it, but they can be traced again on the other side of the hill about a quarter of a mile south. The principal fissure, which is shown on the plan. can be traced for about a mile, its presence being indicated by a peculiar dark brown loam and a distinct line of break in the sandstones. There is. however. no indication of coal on surface, and the manner in which the fissures have been located and followed up is very creditable to the prospector in charge of the work. On the main line of fissure a shaft has been sunk to a depth of 37 feet 7 inches. the first nine feet being in debris. then through 22 feet of carbonaceous matter mixed with coal. At a depth of 31 feet the coal becomes solid and hard, showing a width of five feet without any incursions. except a few isolated small particles of shale which have the appearance of having been rounded at the edges by attrition. In appearance the coal is bright. with signs of crushing and shearing. the stratified appearance of coal usually formed in seams being entirely absent. The occurrence of a seam of coal filling a vertical fissure at right angles to the bedding planes of an aqueous formation is so unusual that it is necessary to put forward a theory to account for it. The evolution of such a theory must be the outcome of a careful observation of the geological conditions existant. I. therefore. after careful examination. put forward the theory illustrated on the sketch plan. There it is assumed that the coal seam is existing in the usual or horizontal manner. That a magna or molten mass is being formed below this horizontal strata. from which. owing to heat, a pressure is being generated. which pent-up pressure eventually breaks through the overlaying strata. forcing its way to the surface. The result of this being apparent in Fig. 11. cracking of the horizontal strata must necessarily take place. creating fissures as described; at the same time crushing and shearing must also occur. Therefore, the softest material. viz., the coal. must be the first to be affected. the result being that it would. on account of its softness and lowest specific gravity. be squeezed out from the original habitat and forced along the lines of least resistance, viz., the vertical fissures where it is to-day found. As far back as 1879 E. J. Dunn put forward the theory of coal measures overlaying the Dwyka Conglomerate. and estimated that coal would be found underlaying the Ecca and Beaufort beds in the centre of the Karroo basin, which theory he considered greatly strengthened when the Vereeniging coal was found resting on the Dwyka Conglomerate. Subsequently coal was found in vertical fissures high up in the Nieuwveld escarpment. which belongs to the lower Beaufort beds. This occurrence was sunk on to a depth of 300 feet. This is about fifty-six miles north-east from De Drift. at a horizon which. according to the geological survey maps. is over 3,000 feet higher than the occurrence under review. I therefore suggest that with coal at a lower horizon. fifty-six miles from the first discovery, there is every reason to entertain the theory put forward by Dunn so long ago. and to assume that the De Drift fissures owe their enrichment to this source of origin. viz., a coal seam between the Ecca and the Dwyka Series.

ECONOMIC VALUE.

As no development work has been done to prove the nature and extent of the coal deposits. the present sampling and analysis can only be taken as a guide to future possibilities. An average sample carefully taken from the seam across five feet in the shaft. and also a grab sample from the dump. which samples. being analysed in Johannesburg. gave the following results:—

Coal Sample.	Surface.	Shaft.
Moisture. per cent.	2.50	2.70
Volatile matter. per cent.	7.62	7.67
Fixed carbon. per cent.	77.05	74.47
Ash. per cent.	12.83	15.16
Total	100.00	100.00
Combustible. per cent.	84.67	
Calorific value	12.64 lbs./lb.	

The above results show that the coal is far superior to many of the Transvaal coals. and also a long way better than anything produced in the Cape Colony. Its heating value is about the same as the average Middelburg (Transvaal) Collieries round coal. It is distinctly anthracite. and would produce little or no smoke. The quantity of ash in the above samples is too high for a good anthracite. viz., 12.83 per cent.-15.16 per cent., and in this respect I think it only fair to mention that the two samples analysed in Capetown only show

2.61 per cent. to 8.58 per cent. There is also a discrepancy between the Capetown analysis and the Johannesburg in regard to the volatile matter, Capetown showing 14 per cent. to 28.77 per cent. against Johannesburg 7.62 per cent. The discrepancy between the analysis of my samples and those sent to Capetown is due apparently to the fact that in the coal occur narrow seams of brilliant coal of a very high-class nature, and while in the Johannesburg analysis the tests are on carefully taken average samples, those sent to Capetown may be, and probably are, the analysis of selected coal. As, however, the coal seam from which samples were taken occurs in the neighbourhood of an intrusive dyke, it may be safely assumed that it will become more bituminous further away from the dyke or at such places where it is found under normal conditions, and may ultimately develop into a good semi-bituminous coal, the value of which, situated as it is so near Capetown, with a calorific value of 12.64 lbs. 'lb., would render it a very valuable proposition. As the internal combustion engine is now taking such an important place as a power generator of the present day, a few notes as to the possibility of this coal for such purposes may not be out of place. The analysis of coal shows that the same is quite suitable for use in suction gas plants for supplying gas to internal combustion engines provided that the gas plant is suitably designed for using such fuel. The quantity of ash, from 12 to 15 per cent., is, of course, greater than is found in Welsh anthracite, where the percentage usually does not, as a rule, exceed 4 to 6 per cent. Therefore, in using this coal it would be necessary that the grate area of the suction plant should be increased proportionately. The volatile matter, though high, is not sufficiently high to make it likely that difficulty will be experienced with tar troubles provided that additional cleaning plant is supplied with the gas plant. The quality of the coal, viewed from the point of view of the suction gas plant, appears to be in every way equal to the ordinary Anthracite coals at present beiog used in this country from Natal and other Colonial sources.

POSSIBLE WORKING COSTS AND PROFITS.

The working costs must necessarily depend on the output, that is, the larger the tonnage produced, the lower will be the cost per ton, and the greater the profit. Therefore, until an extensive market has been established, one can only speculate on possibilities. It is, of course, impossible to determinate accurately what the working costs will be, but in order to establish a basis, the Transvaal costs, which vary from 2s. 7d. to 3s. per ton, might be taken. Assuming, therefore, that the De Drift coal working costs were 3s. per ton, and that the railage to the most important market was 10s. 6d. per ton, total 13s. 6d. The selling price of coal in Capetown is, I understand, 22s. 6d., leaving a margin of 9s. per ton to cover agency fees and profit accounts. It must, however, be distinctly understood that the success of the proposition necessarily depends on two things: First, the coal seam, its area, width, and value; second, railway facilities for getting the coal to the market. The second, no doubt, can be obtained, provided the first is proved.

RECOMMENDATIONS FOR PROVING THE EXTENT OF THE COAL.

Seeing that the coal has been found in a vertical fissure apparently of a workable width and payable value, and that this fissure can be traced for a considerable distance on surface, I would recommend that a series of shafts or winzes be sunk along the line of fissure at distances of 400 feet apart, and that the same be connected by a drive at a depth of 150 feet from surface. At the same time two of the shafts should be continued sinking in order to determine the source from whence the coal originates, and from them levels can be opened up as required and circumstances demand, the idea being that should the vertical seam show continuity along its strike of a payable width, it should be mined as a vertical seam, for there is no reason why a vertical coal seam should not be made to pay as well as a horizontal, the conditions applying in each case, viz., area, width, and value. In this instance, however, it is to be expected that pinching and widening of the fissure will be met with. At the same time, suitable places in settled country should be selected and boreholes put down to determine the position and extent of the coal seam from which the vertical fissures have derived their filling. Having by the above means determined the possibilities of the coal seam, and should such work give satisfactory results, there would be no difficulty in getting railway communication in order that the coal might be put on the market at advantageous rates.

IN CONCLUSION.

I have no hesitation in recommending the De Drift coal proposition as a very promising mining venture with every reasonable prospects of its turning out a success, and I do so for these reasons: (1.) Its economic value, which is good. (2.) Its position, viz., about 230 miles from Capetown, where there is one of the best markets for coal in South Africa. (3.) I am convinced that the coal was forced into the fissures from below, and it is only reasonable to anticipate that the seam from whence the coal was derived, will be found at the contact of Ecca and Dwyka Series. Payable coal has already been found between the Ecca and the Dwyka series, and everything would point to it being so in this instance. Therefore, I consider that the occurrence fully justified the necessary capital being spent in order to open it up and thoroughly prove it. If the venture proves successful, the profits which would accrue would yield handsome dividends to those risking their money to exploit it.

Copy of Analysis dated 11th November, 1914, made by Government Analyst, Capetown, of various samples of Coal taken from different places on the property of the Karoo Coal Development Syndicate.

No. of Sample.	Water.	Coke.	Ash.	Volatile Hydro-Carbons °/o	Fixed Carbon °/o	Sulphur °/o	Calorific Value in B.T.U.
1.	5.85	80.49	15.31	13.66	65.18	1.44	13,300
2.	3.01	90.27	17.05	6.72	73.22	1.21	12,300
3.	1.68	91.34	7.51	6.98	83.83	1.32	14,800
4.	1.64	91.90	10.83	6.46	81.07	1.17	13,800
5.	1.62	92.55	7.23	5.83	85.32	1.44	13,800
6.	5.25	82.41	5.51	12.34	76.90	1.12	12,900

Mr. Andrew F. Crosse's report is as follows:—This is to certify that the following are tbe results of the analysis made on the 12th inst. per Mr. A. L. Chambers for analysis:—

	Sample A. per cent.	Sample B. per cent.
Moisture...	1.00	1.00
Volatile Constituents...	4.70	5.25
Fixed Carbon	91.98	86.64
Sulphur	0.27	0.27
Ash	2.05	6.84
Specific Gravity	1.38	1.48
Calorific value by Mahler Bomb Calorimiter	14.96	14.50

Remarks.—Ash brown, flame scarcely visible, non-smoking, and non-coking. Sample A. was marked "Bright Anthracite"; Sample B. was marked "Dull."

OUTLOOK FOR ZAAIPLAATS TIN.

Recent Development "Interesting and Satisfactory"—"T.C.L." Offer Withdrawn.

In the quarter ended 31st October, 1915, the Zaaiplaats mill ran on 101·4 days, during which period it crushed 7,300 short tons, the duty per stamp being 9.6 tons per 24 hours. In addition 5,575 short tons of sand and slimes residues were re-treated, while 15,219 tons of overburden were dealt with by the alluvial plants. The output for the quarter amounted to 210 long tons of concentrates, assaying 69.2 per cent. metallic tin. The estimated profit for the quarter, excluding Government taxes and directors' fees, amounted to £4,974 16s., made up as follows: Estimated profit for the three months' operations, £5,866 2s. 8d.; *less* adjustments of estimated values of previous shipments, £891 6s. 8d.; profit declared for the quarter, £4,974 16s. N.B.—The average price per ton of metallic tin on which the above figures have been calculated is £153 16s. 9d. The developments during the quarter were both interesting and satisfactory. In No. 13 section the ore body gained in value and also changed its course, and at the end of the quarter was pitching steeply into the footwall. A large deposit of pipe matter was encountered in the north drive, Camp Workings. Although at present unpayable, this is the largest mass of ore discovered for some years. During the quarter 10,107 tons of ore was mined and disposed of as follows: Waste sorted, 1,996 short tons; sent to mill, 7,330 short tons; added to reserve, 781 short tons; total, 10,107 short tons. A considerable falling off in the supply of native labour occurred towards the end of last month, and owing to the advent of the ploughing season a further diminution is expected. At the present time the supply is sufficient for all purposes. 3·13 inches of rain fell on four days and the Sterk River is now flowing with full strength. No dividend was declared during the quarter, but the matter will receive further consideration at a later date, and it is hoped that a dividend will shortly be paid. During the quarter a tentative offer was received from the Transvaal Consolidated Land and Exploration Company to sell its mining lease adjoining our property, which offer your directors are prepared to accept. After considerable negotiation, however, the offer was withdrawn and the negotiations thus proved abortive.

POSITION AND PROSPECTS OF FRASER AND CHALMERS.

Continued Progress of the Business—Current Year's Prospects.

The ordinary annual general meeting of Fraser & Chalmers, Ltd., was held in mail week, at Winchester House, Old Broad Street, London, E.C., Mr. A. W. Tait (the chairman) presiding. The Chairman, in moving the adoption of the report and accounts, said: The net profit for the year, after providing for all expenses and depreciation on buildings, plant and machinery, was £12,058, as compared with £8,377 for the previous year and £4,604 for the year to June 30, 1913. The progress which was shown last year has been maintained, and although the results are not good, there is some measure of satisfaction in the fact that progress has been recorded during a particularly difficult time. As you will observe from the report, the trading for the period has been affected by the war, and difficulties have been experienced in obtaining supplies of raw materials and in maintaining a sufficient labour force. These are difficulties which apply practically to all engineering concerns in this country at the present time; but I think they have been somewhat accentuated in our case. As I mentioned to the shareholders last year, there was a falling off in the number of orders and enquiries for Erith manufactures immediately after the outbreak of war, but after some time had elapsed a better tone had been observed, although it was hardly to be expected that the normal volume of business would be secured during the year. That forecast in a large measure proved to be correct, because, although the turnover in value was approximately the same as the previous year, in tonnage it was considerably less, the levelling up in money value being largely the necessary result of increased cost of manufacture in these times. The progress recorded in the manufacture and sale of steam turbines and turbo-blowers last year has been fully maintained during the year under review, and the results from this department show an improvement, and there is every promise that it should continue to grow in importance. The company has now an established name in this class of manufacture, as is evidenced by the increasing number of enquiries and orders which are received. This department is growing in importance, and in the near future should be one of the principal departments of the company. Considerable progress has been made in regard to the manufacture of dredges, and we have had decided encouragement in the experience of the construction of the last three dredges built.

South African Business.

I am pleased to say that during the year under review the business in South Africa has shown some improvement. This is to be accounted for by the increase in the demands which sprung up shortly after the outbreak of war for many stamp mill and other supplies in view of the danger of a shortage and the cutting-off of supplies from Germany. Owing to the pressure of the demand, we have had to place some of our orders in the United States, but we hope that in time this position will adjust itself. The progress in these results is, after making deduction for South African income tax, which is a new item of expense against the business there. The trading in Australia, and also in Canada, shows a falling-off as compared with the previous year, but this was to be looked for in view of the financial conditions ruling in these Colonies. Certain new business has been secured in Australia, and the satisfactory crops in Canada should improve conditions there in the near future. It is, however, reasonable to assume that when conditions again become normal the volume of trade to be secured in these countries should be considerably augmented, especially if a certain measure of legislation is adopted whereby the manufacturers of the United Kingdom obtain a substantial preference over those of alien enemy countries. The remaining departments of the company's business do not call for any special comment, except that during the year the company appointed a representative to look after its interests in Russia. He has established himself in Petrograd and has opened offices there. Although there is not much prospect of immediate business, largely due to the exchange problem with Russia, the ground is being prepared for future work. The only other matter I need mention is the erection of a new and larger power station at the works at Erith, to meet special conditions which have arisen. The company has entered into a contract for a limited period for the supply of electric power to Vickers works. This contract is a satisfactory one. In the event of it not being continued after the expiration of the existing agreement, the power station will supply all the needs of our own works at a considerably lower cost for power than in the past. The concentration at Erith of the sales departments and general accountancy with the manufacturing end of the business has proved a great advantage to the work generally, and has largely contributed to more efficient and economic administration under the direction of Mr. Rogers, the general manager.

The Balance Sheet.

In the balance sheet the Erith works stand at £202,113, as compared with £189,006 in the previous year. The increase is largely to be accounted for by the new power station which I have just mentioned, together with increases to plant, machinery and tools, less the usual provision for depreciation, which you will observe is £10,400 this year, as compared with £9,385 last year. The increase in the freehold property at Erith from £2,283 to £2,853 is accounted for by the balance of the cost of the purchase of a house for the general manager, to which reference was made last year. Real estate, buildings and plant at London and branches stand at £18,259, as compared with £20,949 in the previous year, the decrease being depreciation which has been written off these items, particularly at the branches. In this year's accounts we have stated separately the value of machinery in course of construction, which appears at the figure of £59,384, as we felt that the shareholders would desire to have this item entirely separated from stocks at the works and at the branches.

Works Fully Employed.

I wish to correct a feeling which I believe has been in the minds of certain shareholders, that the company has benefited by the war. This is not the case, and it has been an extremely difficult time for the board and for the management to keep the business running in face of the many changes and difficulties which have arisen during the period. The company's works are, however, at the present time fully occupied, and provided there is no extraordinary change in the situation during the next few months, there is reason to believe that the results for the current year should be as favourable, if not more so, as those which are now submitted to you. Before closing my remarks, I desire to record the appreciation of the directors of the excellent services rendered by the whole of the staff, and particularly by the general manager, during the trying and difficult time.

Mr. W. B. Rommel seconded the motion, which was carried unanimously.

The retiring directors (Messrs. R. T. Bayliss and A. W. Tait) were re-elected, the auditors (Messrs. Deloitte, Plender, Griffiths & Co.) were reappointed, and the proceedings closed with a vote of thanks to the chairman, directors, managing director and staff.

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Prof. YATES prepares candidates for the following Government Certificates:—
MINE MANAGER'S.
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SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - 60% ,,
MECH. ENGINEERS - June (Kimberly Centre) - - ALL ,,
MINE OVERSEERS - - - - - - - Practically ALL ,,
NEARLY 200 SUCCESSES. **St. James' Mansions, Eloff Street.**

THE PROBLEM OF THE NEW RAND, LIMITED.

A Recent and Very Detailed Report—Main Reef Zone Supposed to be Near—Some Suggestions to the Company.

A REPORT by Mr. A. R. Sawyer, dated the 7th October, 1915, and dealing with the results obtained from boreholes No. 20 and 21, on the property of the New Rand, Ltd., has recently been issued to the shareholders of the company. The report is of a somewhat voluminous kind, and comprises 24 pages of information relating to the strata and dykes that have been intersected in the boreholes referred to. The depth of No. 20, which was started on the 2nd April, 1914, and completed on the 1st August, 1914, is 2,260 ft. 7 ins., and that of No. 21, which was begun on the 21st January, 1915, and was temporarily stopped on the 11th August last, precisely at 8 a.m., is 2,511 ft. 6 ins. from the surface. In a prefatory note, Mr. Sawyer remarks that he does not apologise for the amount of detail which a proper representation of the facts necessitates, in other words, for the lengthy and minute description of the cores, as he considers it incumbent upon him not only to obtain every information which may lead to the discovery of the reefs by a thorough examination of the cores, especially in view of the cost of procuring them; but to place them before the board in support of his conclusions. After this explanation, it is rather disappointing to find that the conclusions arrived at are vague and indefinite, as samples of geological reasoning, although unhesitating enough as an expression of opinion. As stated in large type, they are as follows:

"1. The medium-grained quartzites, grits and stringers intersected in Nos. 20 and 21 boreholes are where I expected them to be, and are identical in character to those which occur above the reefs on the Rand.

2. The diabase intrusion, at the margin of which No. 21 borehole was unfortunately stopped, and which presents different characteristics from previous intrusions, is, in my opinion, a sheet which has wedged itself between the sedimentary rocks, those beneath it probably containing the reefs.

3. A diabase intrusion, although thinner, similarly divides the quartzites, grits and stringers from the reefs on some of the mines of the Rand.

4. The position assigned to the reefs in my section accords more or less with that of its geological horizon.

I, therefore, strongly recommend that No. 21 borehole be deepened as soon as possible, in order to prove the reefs, which will, in my opinion, in all probability be thereby intersected." It is explained that the next 200 ft. would, in Mr. Sawyer's belief, give sufficient evidence of a negative or positive character as would suffice; but it is suggested that the company should be prepared to bore to a depth of 3,000 feet if necessary. Taking these conclusions in their order, it may be observed in regard to No. 1 that a comparison of strata of the kind mentioned, at a distance of nearly 60 miles apart, can only be a process of a most hazardous kind, as has been proved by Rand prospectors and others, in spite of themselves, time after time. Taken in conjunction with other evidence that of the physical appearance of quartzites, etc., may have some weight, but by itself is of little value. As far as we can see after a careful perusal of Mr. Sawyer's report, there is no other collateral evidence to give any importance to the statements of conclusion No. 1. Conclusion No. 2 does not seem to have any real bearing at all upon the subject under discussion. The same criticism may be applied equally well to conclusion No. 3. A diabase intrusion is an accident, as far as correlation of strata is concerned, and cannot be used as throwing any light upon the geological horizon of the beds in which it occurs. Apart from any grounds for the last conclusion—No. 4 on the list—one is led to accept it as an opinion rather than a fact, and it is doubtless intended to be taken in this way, because in referring to a section which accompanies the report, Mr. Sawyer says that his view as to the probable position of the reef is based on the "facts and opinions" contained in the remarks just quoted.

NEW RAND DIFFICULTIES.

It is rather unfortunate that the diabase intrusions, the description of which takes up a large portion of the report, have been so extensively developed in the strata which are being investigated by the boreholes. An examination of the section shown in this report, and of one which accompanies a paper read before the North Staffordshire Institute of Mining and Mechanical Engineers in 1912, makes it clear that an unusually large number of interstratified sheets intervene between the beds of the Witwatersrand succession on the New Rand area. The same sections show numerous faults, also, many of them hypothetical, but in any case the diabase intrusions and the faults together have combined to render Mr. Sawyer's task an extremely difficult one. Upthrows are indicated at frequent intervals, the nearer the assumed Main Reef zone is approached, and compared with the appearance of the section from the 9th to the 17th borehole, the structural complications appear to be on the increase. In the latest section the Main Reef zone is assumed to lie at a very short distance below the bottom of borehole No. 21, within three or four hundred feet of it in fact. It occupies a somewhat similar position on the section, indeed, to that which it did on the 1912 section, except that in the latter case it was just missed by the No. 15 borehole, and not attained by the No. 17 borehole. Now we find that it has been just missed by borehole No. 18, passed through presumably, in faulted ground by No. 20, and within easy reach of No. 21. Although we fail to follow Mr. Sawyer in his conclusions, or to share his long-sustained enthusiasm with regard to the outcome of his researches, we think it would be a pity if the theory could not be conclusively tested because of the small amount of money required to carry the investigation down to 3,000 ft. The diagram is so alluring that the shareholders of the New Rand can scarcely be blamed if they have one more dash for the elusive Main Reef. It would at least be some satisfaction to obtain the definite evidence, either of a positive or negative character which is expected within the next few hundred feet. After that, whether the evidence be favourable or the reverse, in the opinion of the consulting engineer, it would be advisable to call in another geological adviser to consider the whole problem jointly with him. The Witwatersrand systems, both upper and lower, have apparently been located in the New Rand area; certainly the lower one, and it would be an unhappy ending to a long and courageous undertaking if the great quantity of data already collected were not submitted to the fullest possible examination. If the company itself were unable to have this work done thoroughly it would, we consider, properly fall within the scope of a Government examination, with, of course, certain advantages guaranteed to the company in the event of the latter proving favourable.

GEOLOGICAL SURVEY OPINION.

The suggestion of an examination by a Government geologist is made in view of the importance of the New Rand data, not merely to the company, who have spent so much money and time in obtaining them, but also by reason of their usefulness in connection with the geological survey of the further Rand areas. The last communication made by Dr. Mellor to the Geological Society of South Africa, shows that the survey has advanced a considerable distance in that direction, and since, in the usual order of things the area under discussion will soon fall within the range of Dr. Mellor's work, it would probably pay the New Rand, Ltd., to make special arrangements with the Mines Department with regard to an early visit to their farms. The continuation of the boring proposed by Mr. Sawyer might usefully be carried out in the meantime. In his report, by the way, we find various references to the work of the survey as confirming his personal views, but the remarks at the end of Dr. Mellor's recent paper upon the East Rand, appear not to have met with the attention they deserve. They are as follows: "Consistent and scientific attempts to locate the horizon of the Main Reef zone, largely based, however, upon data furnished by Central Rand sections, have been made far to the south of the Witwatersrand, unfortunately, so far without success. The considerations just referred to regarding the modifications observed to take place in sections of the Witwatersrand system, and in the degree of development of particular conglomerate zones appear to be worthy of careful consideration by those engaged in these and similar operations."

THE POSITION OF THE NIGEL.

Recent Development Results Reviewed—Consulting Engineer's Recommendations.

During the three months ended September 30 development operations at the Nigel G.M. Co. proved unsatisfactory, the 11th level east of No. 3 shaft being almost the only drive in the mine where pay values were disclosed; the average assay value of the reef there was 12·5 dwts. over 36 inches. The drive continued in the new shoot during the whole of the quarter; the width of the shoot along the drive is 498 feet, but as the drive intersects the shoot at an angle its actual width, as far as it is exposed, may be taken as about 380 feet. The eastern edge of the shoot has not yet been reached, and owing to compressed air being more urgently required in Nos. 14 and 22 levels driving in the 11th level has been temporarily suspended. At the Rand Nigel section improved values were found in a winze in the 9th level east of "A" shaft, the average value being 12·1 dwts. over 36 inches; whilst in "C" shaft values increased each month, the latest assay giving 7·5 dwts. over 36 inches.

The Romola Claims.

Prospecting results during the quarter proved disappointing. Operations will be continued for another month or six weeks, and should no pay values be struck by that time, the claims will be given up.

Future Operations.

In consequence of the practically exhausted state of the western section of the Nigel mynpacht and the poor results of development throughout the mine during the last two years, the manager, since April last, found it impossible to maintain profits at the average of the first four months of the year. The position became so acute that in August last profits declined to £55, and in September a loss of £987 was made. In view of the situation disclosed by the first five months' returns, the manager reported on the 7th October that until the portion of the mine east of No. 3 shaft was more fully developed he feared that a monthly loss would be made, and recommended the suspension of milling operations for about six months and in the meantime to push on development so as to expose more stoping faces. At the end of the six months he hoped to be able to restart the mill and run the mine at a profit. The matter being of such a serious nature, the directors considered it imperative to have expert advice before coming to a decision. Consequently a technical adviser was immediately consulted, who, after visiting the property and carefully studying the assay and other plans of the mine, and also discussing the position with the chairman and manager of the company, came to the conclusion that it was inadvisable to suspend milling operations at present, and recommended running the mill on a reduced tonnage of high grade so that even were no profit made any loss would be small, and at the same time to push on by night and day shifts the 14th and 22nd levels east of No. 3 shaft, in order to prove the continuance in depth of the new shoot of ore recently exposed in the 11th level, as the issue entirely depended on proving that shoot from the 11th to the 22nd levels. The board's adviser considered this plan the more economical under the circumstances, and the directors approved of the course suggested, and operations on the lines recommended are now in course of prosecution. It is anticipated that in two months' time the drives referred to will be well into the shoot if it extends downwards that far. Upon striking the shoot in the 14th and 22nd levels, or failing to find it there, the position of affairs will then be reconsidered in the light of the information gained. In the meantime expenses are being cut down to the lowest point consistent with economical working, and the board have hopes the strike will be made and that early in the next year better conditions will prevail.

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PROGRESS ON THE NEUMANN GROUP.

Points from the Quarterly Reports.

The reports of the Neumann companies for the quarter ended September 30 have the following, *inter alia*:—

Witwatersrand Deep.

Profit for the quarter, £50,454 (7s. 11d. per ton). Of the total development 1,574 feet or 83·7 per cent. have been on reef. Altogether 1,450 feet have been sampled. This total comprises 1,007·5 feet, or 69·48 per cent., averaging 9·16 dwts. over 37·02 inches, and 442·5 feet, or 30·52 per cent., averaging 3·52 dwts. over 30·95 inches. The total ore reserves on September 30 were 1,724,903 tons at 6·13 dwts. over 54·75 inches.

Consolidated Main Reef.

Profit for the quarter, £37,887 (8s. 11d. per ton). Excluding main crosscuts, prospecting work, ore passes, stations, shaft winze and rope race (No. 3 incline), 3,294½ feet, or 82·5 per cent. of the development work, have been on reef. Of this 2,746½ feet, or 83·4 per cent., have been payable, value 9·6 dwts. over 48 inches; and 548 feet, or 16·6 per cent., have been unpayable, value 2·8 dwts. over 48 inches. Of the payable portion 2,261½ feet, or 82·3 per cent., have been on Main Reef Leader, value 9·9 dwts. over 48 inches; and 485 feet, or 17·7 per cent., have been on South Reef, value 8·2 dwts. over 48 inches. The ore reserves on September 30 were 869,630 tons.

Main Reef West.

Profit for the quarter, £11,702 (3s. 1d. per ton). Excluding main crosscuts, prospecting work, ore passes and stations, 2,540 feet, or 77·5 per cent. of the development work, have been on reef. Of this 1,267 feet, or 49·9 per cent., have been payable of an average value of 6·7 dwts. over 50 inches; and 1,273 feet, or 50·1 per cent., have been unpayable of an average value of 3·0 dwts. over 47 inches. The payable portion was on the Main Reef Leader. The ore reserves on September 30 were 406,380 tons.

Knight Central.

Profit for the quarter, £10,007 (2s. 6d. per ton). The west subsidiary shaft has been sunk 142½ feet to a total depth of 332½ feet and timbered to 150 feet to 220 feet. The 17th level main crosscut has been started at 242 feet down. The reefs intersected gave the following results:—Main Reef: 19·5 dwts. over an estimated stoping width of 45 inches. Bastard Reef: 2·7 dwts. over an estimated stoping width of 75 inches. Main Reef Leader: 0·2 dwt. over an estimated stoping width of 36 inches. South Reef, lower band: 2·8 dwts. over an estimated stoping width of 36 inches. South Reef, upper band: 0·3 dwt. over an estimated stoping width of 36 inches. The east subsidiary shaft has been sunk 56½ feet to a total depth of 272½ feet, and timbered 90 feet to a total depth of 210 feet. The 16th South Reef auxiliary winze at 400 feet west has been sunk 153 feet to a total depth of 313 feet and timbered to 230 feet down. The average value of the South Reef exposed here was 2·9 dwts. over an estimated stoping width of 71 inches. The winze passed into dyke at 290 feet down. Exclusive of main crosscuts, ore passes and prospecting work, 2,400 feet, or 81·38 per cent. of the development work, have been on reef, and 2,290 feet have been sampled. North of Simmer dyke: A total of 1,610 feet has been sampled, of which 530 feet or 32·9 per cent. average 7·1 dwts. over an estimated stoping width of 50 inches, and 1,080 feet or 67·1 per cent. averaging 2·2 dwts. over 58 inches. South of Simmer dyke: A total of 680 feet has been sampled during the quarter, averaging 3·1 dwts. over 55 inches. This includes 155 feet in the 16th east South Reef drive from the west shaft, which averaged 5·8 dwts. over an estimated stoping width of 41 inches. The total ore reserves as at September 30 were 371,700 tons.

The Hazaribagh district in India is one of the most valuable mica-producing areas in the world. Except for a very small amount from Sweden, all the "ruby" mica comes from Chota Nagpur, and India yields more than half the world's output of mica generally. The country where it is found is of a jungly nature, and this renders observation of the prospecting coolies a difficult matter. These coolies scoop away the earth and find the mica generally at a comparatively small depth from the surface. It is then in irregular lumps, usually not more than 12 in. to 15 in. long, and 6 in. or 8 in. thick. This is split into scales or laminæ. Large sheets are the most valuable, and a piece 30 in. square would probably fetch 100 rupees. When split into sheets it is classified according to size and packed in what are known as books. It is then ready for export. According to the "Pioneer Mail," however, it is very seldom that a large sheet finds its way to the owners of the land on which it is discovered. The coolie usually hides it in the ground, and subsequently sells it to an agent. The nearest parallel to what occurs is found in illicit diamond buying in Kimberley and other parts of South Africa. Although the expenses incurred in working mica are extraordinarily small, the business does not pay if no large "books" are obtained. Consequently, if a firm is consistently being robbed of its best finds, it naturally fails, and this is the reason for the failure of so many firms.

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Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Robinson Deep Scheme.

QUESTIONS OF ORE RESERVE AND FUTURE PROFITS.

To the Editor, *South African Mining Journal.*

Sir,—In your issue of November 20th, you publish the greater portion of Mr. Birch's remarks made at the recent special meeting of the Robinson Deep G.M. Co., Ltd. There is one point in those remarks I find I omitted at the time to reply to. Mr. Birch gives the ore reserves of the Robinson Deep as 1,878,000 tons, and then adds to this 4,500,000 tons as being contained in the remaining unworked area, which area at the 31st March last was estimated as being equal to 82 claims. These figures, of course, are incorrect, as naturally the 1,878,000 tons which are represented as the ore reserves are contained in the unworked area and, therefore, must not be added to the contents of that area. Then, again, Mr. Birch estimates a profit of 9s. per ton for the remaining life of the mine, and bases this assumption on past results. When consideration is given (a) to the value of the existing ore reserves as compared with a few years ago; (b) to actual recent results; (c) to the difficulties of being able to keep down working costs towards the latter end of the life of the mine, when mining operations will be very confined and long tramming distances would prevail; (d) to the possibility of heavy expenditure in the maintenance of the No. 2 vertical and incline shafts, then I think there is no doubt but that an estimate of 9s. per ton profit over the remaining life of the mine is considerably too high. Mr. Birch has apparently based this estimate on the *working* profit per ton obtained in the past, and has not allowed for profits tax charges, annuities still due on account of the water-right purchase, nor any capital expenditure which may have to be incurred, and certain other charges as, for instance, the miners' phthisis contribution and the special war levy imposed on the mine last year, which has not yet all been paid.—I am, etc.,

D. CHRISTOPHERSON, Chairman.
Robinson Deep G.M. Co., Ltd.

Rooiberg Tin.

To the Editor, *South African Mining Journal.*

Sir,—I should be pleased to see in an early issue of your esteemed paper, an article from you with reference to the position and prospects of the Rooiberg Tin Mine. I have read the last annual report, which appear deficient in respect of giving a clear idea of the prospects of the property in connection with alluvial ground. I have before me your report of the position at the Rooiberg Mine in your issue of 22nd February, 1913. Can you say whether the Rooiberg Company is in a position to start treating the alluvial now? According to last annual report the dam was completed and the recent heavy rains should certainly have filled it with water. What is the anticipated output to be when working working the alluvial in conjunction with the mine ground? Why has the monthly output dropped from 105 to 85 tons concentrates? Now that the price of tin is on the rise, don't you think it strange that the shares should be standing as low as 14s. 3d., for some time back the shares have been standing at about 14s. 6d., when tin was £150 odd per ton. Now that the price of tin is £176 15s. the shares are lower by 3d. Perhaps you can throw some oil on the troubled water. Thanking you in anticipation,—I am, etc.,

H. W. G. M.

Pretoria, Nov. 17, 1915.

[This letter raises such a number of interesting questions bearing on the factors governing the price of tin and the shares of tin companies generally, that we purpose devoting an article to it in our next issue.—Ed.]

Mining Share Valuation.

To the Editor, *South African Mining Journal.*

Sir,—Allow me to thank you for the articles on "The Valuation of Gold Mining Shares" which have appeared in the *S.A. Mining Journal* during the past three weeks. They meet a want which does not appear to have been perceived, or at any rate, sufficiently considered by those who have published share valuation tables hitherto, inasmuch as they throw a much-needed light upon the basis upon which these tables are constructed. The formula shown in Hoskold, Inwood, and the rest, are too intricate to be conveniently carried in one's head, and, moreover, the buyer of shares has not usually a familiar acquaintance with algebraic methods. A few examples of the various ways in which the formula quoted in the last article is used would, I think, be a useful addition to what has already been written on the subject.—I am, etc.,

BROKER AND SHAREHOLDER.

Excess Profits Tax.

In the House of Commons in mail week, Mr. McKenna, replying to numerous questions upon the subject, gave definite assurance that companies where special conditions operate—as, for instance, mining and rubber undertakings—will be fairly treated under the Excess Profits Tax, and all factors considered. Mr. McKenna pointed out that while in the Bill 6 per cent. is given "as the normal rate anybody is entitled to," it is also provided in Clause 38 for an increase of the percentage standard. Referring to rubber companies, the Chancellor said: "If I were a Referee I should look upon it as ridiculous to suggest that 6 per cent. is an appropriate rate of interest, seeing that these companies do not pay under five or six years." He made similar observations regarding mining companies, but mentioned that these special cases are for the Official Referee to decide; and "the Referees are a business body, well qualified to judge of these points, and will take a fair view of what the allowance ought to be."

* * * *

The Diamond Industry in Parliament.

On Tuesday Mr. Sampson asked the Minister of Mines in the House of Assembly whether his attention had been called to the reports that large sales of diamonds had taken place in America and elsewhere, and, if so, what steps the Government intended to take to bring about the working of the diamond mines within the Union. Mr. Malan replied, saying he knew there was a marked improvement in the diamond trade as was reflected in the decision to recommence washing on certain mines, but the extent of such operations would depend no doubt on the continuance of the improved outlook. There did not appear to be any necessity for intervention on the part of the Government at the present time. The Minister of Mines replied as follows to a question by Mr. Sampson: The resumption of work at the mines in the South-West African Protectorate had been encouraged by the Government in order to give employment to the local population. Conditions had been imposed to limit the output from the diamond mines for the present, and in order to prevent any dislocation of the diamond market all diamonds now had to be handed over to the Government for safe-keeping and subsequent disposal. The Otavi copper mine was working. Three officers of the Department of Mines were assisting the Administrator in the control of the mine.

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Mine Safety, Sanitation, and Welfare Bulletin.

A YEARS' MINING ACCIDENTS.

At the last meeting of the Chemical, Metallurgical and Mining Society of South Africa, Mr. Chas. E. Hutton, Inspector of Mines, read a paper upon "The Chief Sources of Accident in the Witwatersrand Mines," from which we take the following:—

During last year, said Mr. Hutton, 1,989 separate accidents were reported, resulting in 608 deaths and 1,715 persons injured. The killed and injured came under the following classes of accident:—Explosions, killed 146, injured 167; falls of rock, 204—371; travelling in shafts, 38—27; machinery, 19—95; various (surface), 27—168; various (underground), 174—887. The enquiries into reported accidents showed that 19·8 per cent. had been due to contraventions of the regulations or carelessness; and in regard to the deaths no less than 42·3 per cent. had been similarly classed, or in other words, were preventable. Mr. Hutton dealt at considerable length with deaths due to explosives, both from misfires and gassing, and came to the conclusion that if ordinary care were exercised by the miners, and if the Mines and Works Regulations were observed, accidents due to explosives would be reduced to a tithe of what they had been in the past.

Policy of the Past.

As to falls of rock mining engineers in the past from all parts of the world invariably looked upon the country rock here in comparison to other fields as so hard that the usual precautions for supporting the workings were not a matter of much moment. They had, however, learned that this opinion was a wrong one, and vigorous steps were now afoot to counteract the policy of the past. They had instances proving that the more dangerous the underground workings the safer they were to work in; by this he meant that in mines in which there was almost a continuous settlement of ground going on, managers took such precautions that the workings were made so safe that accidents rarely occurred. The majority of accidents caused by small falls of hanging were due, he thought, to over-confidence or carelessness on the part of the gangers. Miners were too much inclined to take it for granted that because the working place was safe yesterday it would be safe to-day. They had no right to hold that opinion, for the last blast might have so shaken the hanging that a small fall might be imminent, in fact any one of the six mentioned agencies in regard to causes of falls might loosen some ground during the ganger's 16 hours' absence from his working place. For this reason Regulation 106 (5) was framed. This question of examination of the hanging and taking precautionary measures to prevent falls was, as one question, the biggest one they had to deal with, for no less than 68 per cent. of the total deaths due to falls of rock were caused by hanging coming away. For himself he thought that a large number of accidents were due to the criminal negligence on the part of the ganger in charge. Falls of rock from stope faces were more dangerous to limb than to life.

Non-Explanatory Term.

In regard to "strain bursts," commonly called "air blasts," he pointed out that the term "air blast" was quite meaningless, being non-explanatory. How this name came to be a miners' byeword he did not know; "strain burst" was a much better term. Last year (1914) 32 accidents were attributed to "strain bursts." Having dealt with the deaths in drives and crosscuts, Mr. Hutton spoke of the responsibilities of shift-bosses. He said that, given that they were conscientious workers, their duties might appear to them in some instances as being almost impracticable, for not only did the law demand that a shift boss should be responsible for the proper observance of the requirements of the regulations by the gangers and miners working under him, but the management added more work on his shoulders by making him responsible in no small degree as to handling the broken dirt expeditiously and cheaply, and also in some cases he was expected to see that a minimum amount of waste was stopped, and the reefs properly carried. For shift bosses to do their allotted daily task in an efficient manner, the district which they supervised should be of such an area that it is possible to allow all the working places to be visited at least once during each shift without undue exertion. This fact must be obvious to all managers, particularly at this juncture, when it had to be admitted that numbers of miners on these fields had not had much experience. Shift bosses in visiting the working should not merely take a cursory glance at the place and pass on, but should spend some little time in the stope with the ganger, asking and answering questions in connection with the work and general conditions.

Blows: Not Advice.

Outside the humanitarian aspects of protection which he described in detail, Mr. Hutton said that £116,115 was paid last year as compensation in respect of deaths and injuries from accidents, such an amount being a direct charge against the mines. What the indirect cost, through loss of time, tonnage, etc., amounted to, he was not prepared to say. It was clear, both from humanitarian and monetary points of view, that every effort should be made to bring the accident rate down to a minimum.

Mr. H. A. White, a vice-president, suggested that the natives should have simple instruction by those who were competent to speak their language. And that instruction should be repeated after they had been at work, say, for a month. The common instruction they at present received from miners was expressed in the form of blows.

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THE WEEK IN THE SHAREMARKET.

Firm with Active Specialities—Springs the Feature.

The market remains firm with improving undertone, and there is no doubt that the approach of the dividend season is having a good effect. Springs provided the feature of the week, and enjoyed a boomlet all to themselves. Development is said to be giving improved results and the outlook for the mine is certainly most favourable. Diamond shares are enquired about, but tins have not seen much activity. It is noteworthy that the latest cable from London states that on the Metal Exchange, standard copper closed at £80 10s. per ton; electrolytic copper, £98 per ton; Straits tin, £165 5s. per ton for cash and £165 5s. per ton for three months' delivery. There are no copper shares, unfortunately, dealt in on this market. The splendid speech from the Chair at the New Modder meeting should have a good effect in London, and all the companies owning ground in the vicinity should benefit from it.

	Frid. 19th.	Sat. 20th.	Mon. 22nd.	Tues. 23rd.	Wed. 24th.	Thurs 25th.
African Farms . . .	7 9*	—	7 8	7 6*	8 0*	6 6*
Apex Mines	5 6*	5 9*	6 0	6 3	6 3*	5 9*
Bantjes Cons. . . .	—	4 3*	4 3*	4 3*	4 6	4 3*
Brakpan Mines . .	—	—	67 6†	67 0†	66 0†	—
Breyten Collieries .	20 0*	—	—	20 0*	20 0*	—
Brick and Potteries .	5 0*	—	5 0*	5 0*	—	—
Cassel Coals	19 0*	—	19 0*	19 0*	19 0*	—
Cinderella Cons. . .	2 9*	—	2 9*	—	—	—
City and Suburbans	42 6*	42 6*	42 6*	42 6*	42 6*	42 6*
City Deeps	67 0*	67 6*	67 6*	—	68 0	67 6
Cloverfield Mines. .	5 7*	6 0†	5 6*	5 6*	5 6*	5 4*
Clydesdale Collieries.	14 6*	—	14 6*	14 6*	14 6*	—
Concrete Construction	—	—	—	1 6*	—	—
Con. Langlaagtes . .	38 0†	—	38 0†	36 3*	—	36 0*
Con. Main Reefs . .	19 0	19 0*	19 0*	19 0*	19 0*	19 0*
Con. Mines Selection	10 6	10 9	10 6*	10 6*	10 6*	10 6*
Coronation Collieries.	—	—	—	—	—	25 0*
Crown Diamonds . .	1 9*	1 9*	—	2 6†	—	1 9*
Crown Mines	70 0†	—	—	60 0*	60 0*	60 0*
East Rand Centrals.	2 10*	—	2 11*	2 11*	2 11*	2 11*
East Rand Coals .	1 9*	1 10*	1 10	1 10*	2 0*	1 9*
East Rand Deeps . .	1 3*	1 2*	1 0*	—	—	1 0*
East Rand Props. .	22 0*	23 0†	21 6*	21 9*	21 6*	21 6*
E.R. Debentures . .	—	—	—	£82½*	£82½*	£82½*
Eastern Golds . . .	1 5†	1 3*	1 5†	1 6†	1 5†	1 1*
Frank Smith Diamds.	1 7*	1 8	1 7*	1 6*	1 6*	1 6*
Geduld Props. . .	34 0*	34 0*	33 6*	33 6*	33 6*	33 6*
Glynn's Lydenburgs.	—	—	—	—	10 6*	—
Goerz and Co. . . .	—	12 0*	—	12 6*	12 6*	—
Govt. Areas. . . .	26 9*	27 3	27 0*	27 0*	27 0	27 0*
Jupiters	6 0*	6 0*	6 1*	6 1*	—	6 0
Klerksdorp Props. .	1 6*	—	1 9†	—	1 9†	1 9†
Knight Centrals . . .	10 3	10 2*	10 3*	10 6	10 9	10 7*
Knights Deeps . . .	24 0*	—	25 0†	24 0†	—	24 6†
Lace Props.	3 0*	3 3*	3 3*	3 3*	3 1*	3 3*
Langlaagte Estates .	—	16 6*	—	—	—	—
Luipaardsvlei Est. .	8 6*	8 6*	8 3	8 3*	8 3	8 0*
Lydenburg Farms . .	5 7*	5 8*	5 10	5 9*	5 8*	5 8*
Main Reef Wests .	6 10*	6 10	6 9	6 9*	6 9	6 6*
Meyer & Charltons.	110 0†	—	—	—	—	—
Middelvlei Estates .	1 3*	—	1 3*	1 3*	1 3*	1 3*
Modder B.'s. . . .	117 6*	117 0*	117 6	118 0*	118 3*	120 0†
Modder Deeps . . .	105 9	105 0*	106 0	107 6	107 0	107 0*
New Boksburgs . .	1 0*	1 0*	1 0*	1 3†	1 0*	1 0*
New Eland Diamds.	7 6*	7 6*	7 6*	7 6*	7 6*	7 6*
New Era Cons. . .	7 0*	7 3*	7 2*	7 1*	7 3*	7 4
New Geduld Deeps .	2 7*	2 7*	2 7*	2 7*	2 7*	2 8*
New Heriots	—	—	—	—	60 0†	60 0†
New Kleinfonteins .	23 9	23 6*	23 9	23 6	23 9*	24 0
New Modderfonteins	310 0	310 0†	305 0†	310 0†	305 0*	302 6*
New Rietfonteins . .	—	0 3*	—	0 3*	0 3*	0 3*
Nourse Mines . . .	—	—	—	—	—	18 0†
Premier Deferreds .	100 0*	—	—	—	—	—
Pretoria Cements. .	47 0†	45 0*	45 0*	45 0*	45 0*	45 6*
Princess Estates . .	—	—	—	2 6*	3 0*	3 0*
Rand Collieries. .	—	—	—	—	1 9	1 9*
Rand Klips	4 5	4 4*	4 5	4 4*	4 4*	4 4*
Rand Mines	85 0†	—	—	85 0†	—	—
Rand Nucleus . . .	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps .	2 7*	2 6*	2 6*	2 6*	2 8*	3 0
Randfontein Estates .	12 0*	12 3*	12 0*	12 0*	12 6*	12 3*
Robinson	28 9†	—	28 6†	28 6†	—	—
Robinson Deeps. . .	23 0†	21 0*	—	—	21 0*	21 0*
Rooibergs	14 6*	14 6*	14 6	14 6*	14 9*	14 9*
Roodepoort Uniteds .	—	3 3*	3 6*	4 0*	3 6	—
Shebas.	1 6*	—	1 6*	1 6*	1 6*	—
Simmer Deeps . .	1 6*	1 6*	1 6*	1 6*	1 6*	1 6*
S.A. Breweries . . .	32 0†	—	—	—	—	—
S.A. Lands	2 7*	2 7*	—	2 7*	2 7*	2 9
Springs Mines . .	27 9	29 0	29 3	29 3*	30 3*	31 0*
Sub-Nigels	10 0*	10 0*	—	—	10 0*	10 6
Swaziland Tins. . .	30 0*	—	—	20 0*	20 0*	20 0*
Trans. Coal Trusts.	40 0*	41 0*	41 6*	41 6*	42 6*	42 9*
Trans. G.M. Estates	26 0*	—	26 0*	—	26 0	26 0*
Van Ryn Deeps . .	56 3*	56 3*	57 0	57 0*	57 0*	56 6
Village Deeps . . .	—	—	—	—	33 6	—
Vogel Con. Deeps .	—	—	0 9*	0 9*	0 7*	0 8*
West Rand Cons. . .	—	—	8 3*	—	—	—
Western Rand Est.	—	1 3*	1 0*	1 0*	1 0*	1 0
Witbank Collieries . .	—	—	—	43 0†	42 6	42 6†
Witwatersrands . . .	56 0†	56 0†	—	—	—	56 0†
Wit. Deeps . .	27 3*	27 0*	27 0*	27 0*	27 0*	27 0*
Wolhuters	10 3*	10 3*	10 3*	10 3*	10 3*	10 4½
Zaaiplaats Tins .	11 3*	12 0†	11 6	11 0*	11 0*	—

* Buyers. † Sellers.

Tanganyika Concessions. Despite difficulties, financial and otherwise, the directors of "Tanks" have succeeded in completing the earthworks of the Benguella Railway to kilometre 631. This work has progressed slowly; it is nevertheless an achievement. Whether the war will prevent the realisation or hopes of Mr. Robert Williams to reach Katanga within three years, instead of eight, as originally contemplated, remains to be seen. Local traffic on the 520 kilos in working order has assisted the finances very substantially; when the rails now being laid on the new portion can be utilised an extension of local traffic should ensue. This revenue is only a kind of side show; the object of the railway is to open up the great Katanga copper belt and the Belgian Congo.

Pittsburgh Steel Company
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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Sharp Rise in Turpentine—Glycerine and Spelter said to be Commandeered—Boiled Oil Shortage Relieved—Commercial Broker's Opinion.

This has been an exciting week in consequence of the recruiting boom for the German East expedition. Naturally it monopolised the conversation on the Commercial Exchange. However, when business was discussed it was stated that according to private cable advices, another ship which had been booked for sailing to South Africa had been cancelled. Another bit of news is that the British Government has commandeered, for their munition factories, the glycerine which it is said the various soap works had been saving up for higher prices. However, it was also satisfactory to hear that the British Government always spares sufficient for use in the South African dynamite factories. It further transpired that we are not receiving any dynamite from oversea, therefore the requirements for our gold fields, etc., have to be supplied by the various dynamite factories in this country, thus more soundly establishing that industry in South Africa, but so far the price has only advanced about 3 per cent. since the pre-war period. Another commodity commandeered by the British Government has been spelter, which made galvanised iron sharply advance oversea, which has been reflected to some extent here, but not over-much at present, as good stocks have recently arrived, and the demand is not any too good just at the moment. Nevertheless those who should be in a position to judge say that it would not be surprising to have a big jump on this side any day. Business during the month of November has not been at all good, but something a little better is expected at the beginning of December to carry the mines well over the holidays.

Second-hand Material.

The demand from the mines is becoming more pronounced for second-hand material. At one time the buyers would not look at such, but now if the second-hand dealers have anything decent in the shape of timber there is no difficulty in selling it to the mines. The demand also for iron battery spares, machinery parts and such like things not used too much can be traced to the big mines. It will be remembered that the French Rand and other mines have been dismantled and now the various things have been sorted up, it can readily be seen what materials are suitable for the producing mines, when some of the selected is purchased and so made to supplement the new material. There is a good demand for small batteries from two to five stamps for the Pietersburg-Zoutpansberg district, and these have become very scarce through their gradual absorption in Southern Rhodesia and the Northern Transvaal, etc. These small batteries are occasionally made here, but more often the various parts found in the second-hand yards are repaired and put together into whole machines. It is anticipated that to obtain new small batteries from Britain we must have much patience; nevertheless when the want is made apparent, America may come in and fulfil our requirements with small stamps and light batteries generally.

Timber and Building Materials.

At the various timber yards and saw mills, business has become disappointingly slack and orders are not coming in fast enough to absorb the doors, window frames and the standardised joinery required for private houses. This is not unusual at this season of the year, as there is never much activity until after the year-end holidays, certainly not in the starting of new works and erections. Since the ready-made doors, door frames, windows and such like have not been coming forward from Sweden and other countries, a feature of our saw mills has been the manufacturing of them and similar work to replace the imported articles. Notwithstanding this temporary lull, the making of building material requirements has come to stay, they may from time to time change in degree, but with the perfection of machinery for this class of work the best class of goods can well be made locally, especially as the materials can be selected to stand our climate. The demand for bricks has slackened off considerably, especially for the better class ones, which indicates that the city buildings are being finished as regards the brickwork and nothing of importance is being started again just now. Glazed bricks have been advanced from £25 to £27 10s. per thousand, as some of the ingredients imported from oversea have risen so much in price, as well as being difficult to obtain with any degree of regularity. For glazed drain pipes and other specialities made in the Transvaal, the demand from the coast and other big towns has hardly ever been so dull, which cannot be accounted for excepting that many jobs already planned out have been pigeon-holed, awaiting more favourable times.

Turpentine, White Lead, and Paints.

Quite a mild sensation occurred during the week over another sharp rise in turpentine. About ten days ago it rose 3s. 6d. and on Monday there was a further advance of 4s. 6d. per case. According to expert information the rise in America has been engineered, as turpentine there is controlled by a strong financial group, therefore it is more than likely the price will come to near normal in less than three months. In the meantime the price has risen locally to as high as 48s. per case, although it can be had for less at some places, as stocks are fairly good in Johannesburg. However, it seems likely that turps will be 50s. a case shortly, if the American control is not relaxed. White lead advanced 20s. per ton in London last Saturday, the 20th instant, and is now from 52s. 6d. to 54s. per 100 lbs. here. Crude South African oxide suitable for granolithic work is 12s. 6d. per 100 lbs. Paints are much the same, but business has gone off considerably of late throughout the trade, both in the selling and in contracting work. The acute shortage position of boiled oil has been relieved by liberal supplies arriving here.

Electrical Goods.

There is practically no tubing in town, that is at the wholesale houses, but a little may be had from retail stores, at something like 15s. per 100 feet. Stocks on the whole are fair, but in some cases, certain lines are scarce, and it may be difficult to replace for some time to come. A letter has been received from one of the principal electrical factories in England, stating that they cannot guarantee to get anything away until towards the end of January, owing to the disorganisation of shipping facilities, as the Government recently commandeered more ships for transport purposes. Enquiries were made from a firm who are in the habit of importing electrical goods from America, and it was discovered that quantities of all kinds were being imported freely and arriving quite regularly in Johannesburg. In the matter of electrical lamps the supplies from the source mentioned have been so plentiful that the prices, on the Commercial Exchange have decreased more when it is a question of tendering. It was supposed that cleats were unobtainable, but it has been ascertained that a quantity is held by a Johannesburg firm, which has somewhat relieved the shortage.

Commercial Brokers.

In an interview with a commercial broker it was gathered that business has been bad during November, but hopes are entertained for an improvement for December, say until about the fifteenth. He was asked about the mines buying second-hand material, and the answer was that if he could obtain second-hand 4 lb. drill hammers he could place any number, if they were in anything like decent condition. The mine buyers were still particular, but evidently they recognise the fact that when an everyday line can be obtained at a reasonable rate it is advisable to pick it up and give storage room, to provide against accidents. He expressed the opinion that he did not think there would be any general shortage of mining material, but now and again lines would run short, as was always the case more or less; however, what with our Johannesburg engineering shops and the regular American importations, coupled with the fact that the British Government always gave every facility to forward anything required urgently by the mines, when advised through the proper channels, altogether he recognised no serious difficulty in keeping the mine stores fully replenished. Further, there was no occasion to worry about the general lines, as these seemed in plenty, especially taking into account the already well-stocked stores of every producing mine. He also remarked that so far as he was concerned, the merchants had been buying a little more liberally amongst themselves during the present year to complete orders, or contracts, as it was often advisable to tender in full and fill up any gap locally. His philosophical view of the position is that everything was all right in the mining world, excepting that competition was exceedingly keen, which obviously became more intense during the intermittent dull times.

Revised Price List.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle, 17s. 6d. to 18s. 6d. per 100 lbs; mild steel bar, 2¾d. lb; drill, 4½d. per lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.: ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 7¾d. to 8d., 11 ft., 8½d., 12 ft. 8¾d.; 26 gauge, 6 ft. to 8 ft. 6¼d., 9 ft. 6½d., 10 ft. 6¾d.; flat galvanised, 18 to 24 gauge 27s. 6d., 26 gauge 28s. to 29s. per 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d. to 9¼d.; over, 9¾d. to 10d. (Oregon, 9⅜d.); flooring, 4½ x ⅞ and 6 x ⅞, 4⅜d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 4d. per cub. ft.; Oregon, 4s. 2d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 21s. to 22s. 6d., boiled, 24s. per 5 galls.; white lead, 52s. 6d. to 54s. per 100 lbs.; turps., 44s. to 48s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, British, Holland and American, 12s. 6d. to 17s. 6d. wholesale and 21s. to 27s. per dozen retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.; tubing, 12s. 6d. to 15s. 100 ft.: keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. 6d. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Trade at Lourenco Marques.

H.M. Consul-General at Lourenço Marques (Mr. E. MacDonnell) reports that practically the whole of the imports of textiles into Lourenço Marques prior to the outbreak of war were of British origin, although shipped to some extent from Continental ports such as Hamburg and Lisbon. Although in many cases the materials were stamped, or printed, or prepared for sale in such ways as would lead to the conclusion that they were of Continental origin, the materials were chiefly from the mills of the United Kingdom. Portugal is a very large exporter of textiles to Lourenço Marques, the reason being that by "nationalising" the goods in Lisbon, consignees save 20 per cent. on the Customs duties on arrival at Lourenço Marques. This "nationalisation" of goods, which must of necessity have an adverse effect upon the revenues of the Colony, is very widely practised, and is effected merely by the payment of a small fee of 12s. 6d. per ship's manifest entry. There are many British and Portuguese Indian merchants established in Lourenço Marques who are in every way deserving of credit, but unfortunately there are many others who cannot be described as conscientious in the settlement of their obligations. Since the outbreak of the war, however, money has become more scarce, and commercial transactions have been conducted as far as possible on a cash basis. An important item in the import trade of Lourenço Marques is the Kafir truck trade, which is almost entirely in the hands of Indian traders, both British and Portuguese. The principal articles sold in this trade are cotton goods of various descriptions. Owing to the uncertainty of the market, and the long terms of credit asked for, British merchants have up to the present preferred to leave this class of business to Continental firms.

Durban Roodepoort Gold Mining Co.,
LIMITED.
(Registered in England).

NOTICE is hereby given that an EIGHTY-THIRD (83) INTERIM DIVIDEND OF FIFTEEN PER CENT (15 o/o), equal to 3s. (Three Shillings) per share has been declared payable on and after the 21st December 1915.

Holders of Shares to Bearer SHOULD PRESENT COUPON No. 83 for payment of the above 3s. (three shillings) per share, at the Standard Bank of South Africa, Ltd., Johannesborg Branch, on and after the 21st December, 1915.

W. A. MARTIN,
W. MACFARLANE,
L. CLARENCE,
G. S KEMPIS.
Local Directors.

Johannesburg, 19th November, 1915.

The Week's Meetings·

APEX MINES, LTD.

SHARE DISTRIBUTION.

REDUCTION OF CAPITAL.

The annual meeting of shareholders of the Apex Mines, Ltd., was held on November 19. Col. Dalrymple presided and the others present were Messrs. G. C. Fitzpatrick, H. Read, J. Andrew Cohen, H. W. Anderson, J. H. Ryan, G .Silver, C. A. Wentzel, G. W. Austin and the secretary, Mr. L. S. Raymond.

The Chairman, moving the adoption of the report and accounts, said:—You will remember that, on the 20th of March, 1914, shareholders resolved to sell the gold section of your company's property to the New Kleinfontein Company, Ltd., for 150,000 shares in that company. The sale was completed, and the shares were received on the 25th of June, 1914. At that time the New Kleinfontein Company, Ltd., had notified its shareholders of its intention to raise further capital to increase its crushing capacity, and your company, as a shareholder, was entitled to participate in this new issue of shares. Your directors considered it advisable to retain the block of shares as an asset of the company, so that the company—on behalf of the shareholders—should be able to participate to the fullest extent in the New Kleinfontein Company's issue. The New Kleinfontein Company, Ltd., was prevented by the Imperial authorities from making the contemplated issue on a basis which was acceptable, and the whole scheme of raising new capital, at any rate for the time being, was consequently abandoned. In the light of this decision of the New Kleinfontein Company, Ltd., the question of the distribution to the shareholders of this company of the New Kleinfontein holding has been reconsidered, and the directors are of opinion that no good purpose will be served by delaying any longer. The New Kleinfontein shareholding is a capital asset of this company, and if the resolution which I shall shortly submit to you is accepted, a distribution of capital will be made. It will be necessary to hold a subsequent meeting to confirm the resolution passed at this meeting, and thereafter to make an application to the Court for an order to allow the reduction of the capital of the company. If it is now resolved to make the distribution, it is expected that all the necessary steps will be completed by about the middle of January, when certificates will be issued to shareholders; the date will be contingent upon registration of the order of the Court, but we do not contemplate any undue delay will take place. I will now put the following resolution to the meeting:—"That the capital of the company be reduced from £300,000, divided into 300,000 shares of £1 each (all of which have been issued and are fully paid up) to £150,000, divided into 300,000 shares of 10s. each, by returning to the holders of the issued shares aforesaid paid-up capital to the extent of 10s. per share, and by reducing the nominal value of all the shares from £1 to 10s. The above return of capital shall be effected by distributing among shareholders registered on the 19th of November, 1915, pro rata to their holding, 150,000 fully paid-up shares of the nominal value of £1 each in the New Kleinfontein Company, Ltd., 20s. of the value of each of such shares being considered as a return of capital, and the balance (if any) of such value as a bonus. All fractions of such shares in the New Kleinfontein Company, Ltd., resulting from such distribution shall be realised by the board of the company, and the net proceeds paid to the shareholders entitled thereto. Further, that the words 'ten shillings' be substituted for '£1' in Article 39 of the articles of associaton of the company."

Adoption of the report and accounts and also the resolution was seconded by Mr. J. A. Cohen and unanimously agreed to.

GLYNN'S LYDENBURG.

LOWER VALUE RECOVERED.

THE ANNUAL MEETING.

Mr. H. C. Boyd presided at the annual meeting of Glynn's Lydenburg, Ltd., held in the board-room of the Corner House on November 19. Others present were Col. Sir Aubrey Woolls-Sampson, and Messrs. B. F. Bourke, C. Meintjes, A. F. Mullins, M. Honnet, and E. W. Smith. The share representation was 13,378 out of the total of 170,000.

The chairman, in moving the adoption of the report and accounts for the year ended 31st July, said:—The net profit for the period, £34,905, was very considerably less than that of the previous year. This is practically entirely due to the lower value recovered per ton milled; 47,809 tons were milled, or nearly 2,000 tons more than in any previous year, and there was a small increase in working costs per ton, not to be wondered at in these times. With the balance brought forward from the previous accounts we had a total of £69,347 to deal with, of which Government taxes absorbed £5,465, included therein being the estimated amount of our share of the special war levy of half a million sterling on the gold mining companies for the 12 months ending March, 1916. Capital expenditure in connection with the increase to the power plant, less credits received in connection with the township, amounted to £1,069. Of the balance, £34,000 were distributed in dividends, leaving £28,812 to be carried forward.

Operations Hampered.

The manager's report gives full particulars of the past year's work, which need not be referred to in detail. The floods in January and February seriously hampered operations, and but for the reserve of broken rock on hand would have effected the output for these months even more than they did. We are receiving a total amount of £663 for resulting loss of profits under our insurance policy. The increase in the ore reserves to 65,000 tons is satisfactory, but a decrease in the average value to 8.4 dwts. per ton is shown. This is mainly due to the lower value of the disclosures in the Werf Mynpacht, where the nearly 29,000 tons developed at the close of the year had an average value of only 7.3 dwts. per ton. It is to be noted that, as stated in the manager's report, these figures as nearly as possible represent milling values, allowance having been made in more liberal terms than in past years for the inclusion of unavoidable waste in the ore sent to the mill. In regard to the current financial year, development is proceeding in the Werf Mynpacht, Mill Hill, South Hill and Compound Hill. In the latter two sections the results continue to be unfavourable, while in the former two, values on the whole are virtually the same as those disclosed last year.

Working Costs.

Working costs show a tendency to increase slightly, as the cost of almost all stores is becoming greater. Realisation charges on the gold produced between October, 1914, and last September inclusive, have been increased, and on this account an amount of some £645 will have to be provided in the present year's accounts. From October onwards, the credit taken for the gold produced has been reduced by the amount of the increased charges. The new generator for the power station has arrived, but the turbine has not yet been delivered. It is desirable that this extension to the power station should be completed as quickly as possible, as the present plant which has been running very well of late is fully loaded. The supply of native labour has been fair recently, but is now beginning to fall off. Unless shareholders express a wish to the contrary, it is proposed to discontinue the issue of a quarterly report for the quarter ending 31st July of each year, in view of the fact that the annual report is available very shortly after the date at which this quarterly report has hitherto been issued. By this procedure a small enonomy will be effected, and the interests of shareholders will, in our opinion, in no way suffer. In conclusion, I would record the board's appreciation of the good services which the manager, his staff and the employes generally continue to render. I now beg to move that the reports and accounts for the year ended 31st July, 1915, be received and adopted.

Colonel Sir Aubrey Woolls-Sampson seconded, and the report and accounts were adopted unanimously. Messrs. E. F. Bourke and E. Mackie Niven were re-elected to the directorate.

NEW MODDER.

EXCELLENT POSITION.

INCREASED PROFITS.

Outlook Never Brighter.

The 18th ordinary general meeting of shareholders in the New Modderfontein G.M. Co. was held on November 24, in the board-room, Corner House. There were present: Messrs. E. A. Wallers (chairman), F. Raleigh, J. H. Ryan, G. Sonn, W. H. Dawe, J. Andrew Cohen, C. Meintjes, W. T. Graham, M. Dold, S. C. Black, B. H. Davis, W. J. Corder, J. R. Nicholson, B. Moses, F. H. Barry, W. Gordon, A. Hyman, J. F. Ferguson, and S. C. Steil (secretary). The representation was 90,106 shares, and the total issue 350,000 shares of £4 each.

The Chairman's Speech.

The Chairman said:—Gentlemen, the report, balance sheet and accounts giving the results of the financial year ended 30th June last have been in your hands for some time, and therefore I propose only to summarise quite briefly the figures reflected therein. The working profit earned was £683,450 derived from 611,500 tons milled, both figures constituting a record in the history of your company. We received certain other items of sundry revenue, interest, etc., and after making contributions to war relief funds and paying the assessment under the Miners' Phthisis Act, we were enabled to carry forward to appropriation account a balance of £692,127. We already had on this latter account an unappropriated balance of £230,114, and this amount, together with a small item on account of unclaimed dividends, gave us, with the balance brought in as a result of the year's operations, a total amount of £922,418 available for appropriation. We paid two dividends of, together 31½ per cent., amounting to £437,500; capital expenditure appropriated from profits accounts for £38,772, and the Government taxes, including the whole of the estimated amount required for the special war levy, accounted for £92,963. We therefore carried forward at the beginning of the current financial year an unappropriated balance of £353,182, of which £236,874 is actual cash and the remaining £116,310 is in the form of ordinary current assets, such as stores, sundry debtors, etc. On comparing this year's accounts with those of the previous year, you will find that we have improved our actual cash position by £94,863, notwithstanding the fact that the amount distributed in dividends was £17,500 more, and that owing to the present abnormal conditions we are obliged to carry more stores, and to have invested in that item approximately £17,000 more than was the case in the previous year. In completing this brief review of your accounts I would draw your attention to the fact that instead of showing the particulars of working expenditure, as has been done hitherto, under the heads of mining expenses, reduction expenses, and general expenses, we now show the expenditure under white wages, coloured wages, stores and materials, and other costs. This change in the presentation of our accounts has been brought about after the most careful consideration, and with the object of providing statistics of increasing value to directors, managers, and other officials

Mining Operations.

I would like now to comment on one or two points in connection with the general mining operations of the year under review which are of interest. The total tonnage drawn from the mine was 738,300, of a mine grade of 7.9 dwts. per ton, as compared with an average mine grade of 9.1 dwts. per ton in the previous year. Increased attention to the elimination of waste rock, however, brought the average mill grade of this ore up to 9.4 dwts., and the final recovery was 9.1 dwts., or 38s. 3d. per ton milled, which is equivalent to an extraction of 97.2 per cent. of the calculated gold contents of the ore delivered to the reduction works. Of the total ore mined 83 per cent. was derived from the ore reserves proper, and had a value of 8.4 dwts. The remaining 17 per cent. was obtained mainly from payable upper leaders, for which consideration could not be given in valuing the ore reserves and ore from development faces. The value of these two last-named classes of ore combined was, as nearly as possible, 5.5 dwts. per ton. From these facts you will observe that the value of the ore mined was lower by 1.2 dwt. per ton than in the previous year, and therefore more in accordance with the average value of the mine as at present developed. Working costs for the year averaged 15s. 11d. per ton milled, which is a reduction of 1s. per ton as, compared with the preceding year. This reduction of 1s., although mainly due to the increased scale of production, was partly due also to the lower charge per ton for development. In considering working costs at the present time, it is well to bear in mind the increased percentage of sorting which, as I have just said, has been in operation, and to give consideration also to the increase in the cost of stores and other items of abnormal expenditure.

In considering the development work accomplished during the year, it will, I think, be clearer if we separate the work done into two sections, namely, the upper and older part of the mine and the lower part of the mine, the latter generally being described as the circular shaft section, i.e., the section from the 11th level downwards. Development work has been carried on with more activity than was possible in the previous year, and a total of 18,142 feet was effected, of which slightly under a half was in the circular shaft section. The footage in the upper mine developed 515,300 tons of an estimated average value of 9.3 dwts., and as you will realise from glancing at the plan attached to the annual report, most of the work done in this section consisted in the extension eastwards of the 7th, 8th, 9th, and 10th levels, with the necessary winze and raise connections. As you will realise from the development values I have just given, the work in this section of the mine, as was anticipated, exposed very satisfactory ore. On the western side of your mine no development work has been carried out above the plane of the 11th level, as we have unfortunately been unable yet to obtain delivery of certain parts of machinery required for the work in connection with the deepening of the No. 2 incline. In fact, in this section of your property no work of any moment has been done for a very long time, as you are no doubt aware, and we are very desirous of taking it in hand as soon as possible—indeed I am hopeful that in a comparatively short time we shall be in a position to do so, now that the native labour position is so satisfactory. It was thought that this upper western side of your property was probably the poorer section, and it is true that data available at that time rather pointed in that direction. In more recent times, however, the operations of our neighbour on the west, the Van Ryn Deep, although their workings are an appreciable distance from our boundary, yet indicate that there is a reasonable anticipation of quite satisfactory results being obtained in the development of this section of your property also.

Huge Ore Reserves.

Before we go on to examine in detail the development work carried out in the lower, or circular shaft section, it would be well to say a word or two on the position of our payable ore reserves, because these as estimated at the end of the last financial year consist only of ore contained in the upper part of the mine. As you will have seen from the consulting engineer's report, the total ore reserves thus computed are estimated at just over 6,000,000 tons of an average value of 8.15 dwts. per ton. As compared with last year ,the tonnage shown in the reserves is less by approximately 300,000 tons and the value less by .25 dwt. As you are aware, your mine is laid out on what is known as the "large block" system, and the small decrease in estimated value as a result of the more complete development by winze and raise connections of several large blocks really calls for no particular comment in the circumstances. I would here call your attention to a feature in the result of last year's operations that is a very desirable one and that has a direct bearing upon the ore reserve valuation. It is that the actual gold contents recovered by stoping operations in the blocks forming our ore reserves were of a somewhat higher value generally than called for by the block valuations. The tonnage of ore in reserve being shown as less by the 300,000 tons I have just referred to is due chiefly, as you will have seen, to the fact that the development work which has been done in the circular shaft section, in the opinion of your consulting engineer, did not justify the inclusion of any ore in that section in the payable reserves.

That brings me, therefore, to the consideration in some detail of the work that has been done in this lower section of the mine, and I want to give you an indication of the tonnage so far developed and the values so far met with. You will, of course, realise that, in view of the fact of comparatively few winze and raise connections having been completed with the lateral development, it is therefore only as close an approximation as possible that I am giving you. Our estimate to the end of last month shows that the ore thus partially developed amounts to 2,066,000 tons, of which it is estimated that 1,656,000 tons have a value of 6.6 dwts. and 410,000 tons have a value of 3.5 dwts., or, in round figures, 80 per cent. of all development was payable. The last named unpayable tonnage fortunately forms to a large extent the shaft pillar. In order that you may have as complete a picture as possible of the development in this section, I will give you the footage and values exposed, level by level. On referring to the plan that is attached to the annual report, you will see that four levels were driven in the circular shaft section, east and west. They will be known in future as the 11th, 12th, 13th and 14th levels.

Improvement in Values.

The reef disclosures in the 11th level driving have been as follows:—

	feet driven	Average value in inch-dwts.
East drive, up to 30th June. 1915	634	263
„ up too 1st July to 31st Oct., 1915 . . .	130	634
West drive, up to 30th June, '15	623	215
„ up to 1st July to 31st Oct., 1915 . . .	235	345

You will notice that the improvement in values recently in both drives is marked.

On the 12th level I will give you the results without separating them into two periods, because the values remain practically unaltered. The figures are:—

	feet driven	Average value in inch-dwts.
East drive	850	314
West drive	875	178

In the case of the western drive I would add that in the last 215 feet driven the average value was 243 inch-dwts., which shows a slight improvement, but the values on this level have been low.

We will turn now to the two last levels in the mine, which will in future be known as the 13th and 14th:

	feet driven	Average value in inch-dwts.
13th Level—		
East drive, up to 30th June, 1915	740	250
„ up to 1st July to 31st Oct., 1915 . . .	215	223
West drive, up to 30th June, '15	974	611
„ up to 1st July to 31st Oct., 1915 . . .	185	166

In these, as you will see, the most recent development work has disclosed a temporary diminution in value.

14th Level—

	feet driven	Average value in inch-dwts.
East drive, up to 30th June, 1915	883	206
„ up to 1st July to 31st Oct., 1915 . . .	220	558
West drive, up to 30th June, '15	891	354
„ up to 1st July to 31st Oct., 1915 . . .	210	1,065

This drive, the lowest in the circular shaft section, and indeed the lowest in the mine, has shown considerable improvement recently. On the whole it would appear as if these four levels, in their progress east and west, are developing ore of which the value has an improving tendency; and should there be a continuation of these more favourable reef disclosures, the average value of the ore developed in this section of the mine will naturally be favourably affected. By the time the new reduction plant is erected at the circular shaft a large amount of additional work should have been completed, and thereafter development can be carried ahead in easy stages.

At the bottom of the circular shaft a considerable amount of permanent equipment work has been done; a large crusher station and the main pumping stations, with sumps and clarifiers, have been cut and are now being equipped with machinery. I may add that, owing to the desirability of making a clean and complete job of the permanent air column equipment, etc., for the shaft, it has not been possible to obtain clearance for any development in this section of the mine since November 1. The work referred to, however, has progressed well, and I think in the course of two or three weeks we shall again be pushing our development footage in this section of the mine with greater efficiency than before. On the surface a good deal has been done towards the permanent equipment in the way of the erection of the main headgear, engine-house and transformer-house. There has unfortunately been delay in the delivery of the drum for the large hoisting engine, and, owing to the abnormal conditions that now prevail, I am not able at present to give the eventual date of its arrival, but there is in any case ample time between now and the date at which the erection of the new plant will be completed.

New Plant.

As regards this new plant, the orders have been placed, as you know, and its capacity is estimated at 40,000 tons monthly. It is naturally difficult to-day to give you a very close estimate as to the cost of this plant or actual time of delivery. The cost will obviously be higher than in normal times, but I think I am on safe ground in saying that it will not be more than £60,000 in excess. Your directors have given this question of the ordering of the new plant the most exhaustive consideration and investigation during the past nine or ten months. We came to the conclusion that from all points of view the best policy was to go ahead with the work. The duration of the war is, unfortunately, uncertain, as also is the question whether the cost of such a plant would be materially less after the war—at any rate for a considerable period. Our course of action will, therefore, I feel sure, at once appeal to you as sound, and the increased cost of the plant sink into comparative insignificance when contrasted with the deferment of profits that would ensue if additional and longer delays in its erection were entertained. It is not possible for me, as I have said, to give a very close date as to when the plant will be ready, but if favourable conditions are present we may be able to commence crushing operations about the middle of 1917.

Pertinent Points.

The questions that I feel sure shareholders will wish me to answer are these. How are we going to pay for this plant, what are the anticipations as to dividend distributions during the period of erection, and finally what will be our financial position when construction is completed? Well, gentlemen, I have an inherent dislike to making prophecies in matters like these, and it is usually an extremely dangerous proceeding. These are questions, however, that I feel I should answer to the best of my ability, and I think I can best do so in the following way. It appears to us that, assuming normal working conditions as at present, we should continue to earn profits with our present plant that should enable us during the period between now and the completion of the additional plant to make dividend distributions on the same basis as the declaration per June 30 last, to erect and pay for our plant, and at the end of the period to have either no debt at all or in any case a debt of comparative unimportance to a company of our standing. You will then have plants erected of a total capacity of 92,500 tons monthly, together with an ore reserve of an exceedingly substantial character, and your profits earned should be free from capital commitments of any moment. I may add that in considering the financial position in this way, I am hopeful that the question of the 50 per cent. freeholder's interest in bewaarplaatsen, etc., will have been settled satisfactorily. The amount accruing to this company up to the 31st of December next in this connection would be approximately £50,000.

Sub-Division of Shares.

As you know, an extraordinary general meeting of shareholders has been convened for the 14th of January next, for the purpose of considering a proposal to sub-divide the present £4 shares into four shares of £1 each. Your directors have been approached in this connection from time to time by shareholders, and we decided to call this meeting in deference to their wishes.

That, I think, really concludes my review of the operations of your company for the past year and its present position. It has been an extremely successful year, and, in common with the rest of the industry, this company has been, and continues to be, in an extraordinarily fortunate position in view of the abnormal conditions prevailing in other parts of the world. You will be aware that a special war levy of £500,000, in addition to the ordinary profits tax that is payable, was placed upon this industry. You will see from your accounts that the whole of the amount due by this company under this special levy has been included, and the total direct taxation payable to the Government for your last financial year amounted, as I previously intimated, to no less than £92,000. As regards our contributions to various funds in connection with the war and relief measures generally, I am sure you will very gladly confirm the action we have taken. Since the close of the financial year we have made further contributions to various funds, and we shall continue to do so with, I know, your hearty approval. The year's work has naturally been carried on under difficult conditions for the staff and the men on the mine. Many of our employes have been on active service in South-West Africa, are on active service in Europe, and I have not the slightest doubt are going on active service to German East Africa. (Hear, hear.) Adequate provision is being made by the company for them and their dependents. Our gratitude is due to those men who are fighting our battles, and is also due to those men who wished to go on active service and could not be spared because of the national importance of the industry in which they are engaged and who are so loyally carrying on their own duties, in many cases with added responsibility.

Finally, I should like to add that it is a matter of great regret to his colleagues that Mr. Raymond Schumacher, who has been chairman of this company for many years, was obliged for health reasons to take up his residence in Europe. To his ability and foresight is due in no small measure the very sound and encouraging position in which the affairs of your company rest to-day. We are very glad to know that he remains a director of the company and remains deeply interested in its welfare, although not so closely connected with its affairs as has been the case in recent years.

I desire to record the board's keen appreciation of the loyal services rendered to the company by your consulting engineer, Mr. Stuart Martin, the manager, Mr. Miles Sharp, and the staff and workers who are associated with them.

I now beg to move the adoption of the report and accounts for the year ended the 30th of June, 1915. (Applause.)

Mr. Black's Recent Visit.

Mr. S. C. Black said: It fell to my lot to second the adoption of the report at our last annual meeting, and it is an equally agreeable task to be present to repeat it on this occasion. Much has happened since last we met together, much that caused all connected with our great industry a gread deal of anxiety and concern. Happily we have emerged in South Africa from a difficult and dangerous situation, and what better proof could be adduced to that effect than the statements presented to-day and your own resume, sir, of the position of the company? About a fortnight ago, I visited the mine and some of the underground works, and I could not but be impressed by the visible evidence of progress in many directions. One cannot be blind to the great expenditure incurred during the past three years on capital account, and the supplementary amounts still to be expended under this head, just referred to by you, but I am satisfied that when the additions to the reduction and other new plant are effected and completed, shareholders will receive the full benefit of the outlays. The facility with which the main haulage drive on the 8th level could deal with large tonnages of ore at the present time, was a revelation to me, as it would be to other shareholders, could they but visit the property and see the work so far accomplished, for when the whole drive, which has now reached a length of some 6,000 feet, is extended to its proposed full distance of 10,000 feet, it will indeed become a trunk line of underground efficiency for the rapid transport of ore, not easily rivalled anywhere in gold mining. It is no exaggeration to say that were the new winder for the circular shaft installed and the additional plant ready to deal with over 90,000 tons per month, the mine could at the present moment provide the necessary tonnage without the least inconvenience. Looking broadly at the whole proposition, could one wish for a more sound and stable mining undertaking than that presented by this company?

The Point that Matters.

After all, whatever academical tests may be applied to the successful direction of a business enterprise, in relation to capital or other expenditure, the ultimate point of interest for the average investor is the net result. Now, the position of this company is such that, so far as one can determine, the profit value on the present developed tonnage of ore represents approximately the market value of the shares, as they stand to-day, which leaves out of account the untapped areas of over 800 reef claims. Can any other mining proposition in the world show anything to rival such a comfortable and assured position? I very much doubt. Mr. Stuart Martin, our consulting engineer, has established a record of solid and substantial work and it is eminently creditable to him, especially when I remember that the adjoining mine, the Modderfontein B., is also under his supervision. If at times I observe a kind of friendly rivalry between the two great Far Eastern Rand properties for pride of place, in the monthly profit record, I realise that it is all to the advancement and credit of those who manage and direct the two mines, and ultimately to the benefit of their shareholders. Your tribute, sir, to the staff and workers, from the consulting engineer and manager down to the humblest of employes, for all their good work during the past year, is usually regarded as the penultimate commonplace to a chairman's speech, but only those who have come in direct contact with the men during the stress and storm of the past year can adequately appreciate and unstintedly praise. I am sure your predecessor in the chair, Mr. R. W. Schumacher, whom I feel we all miss very much from our midst—and especially from the annual meeting of the New Modderfontein—will be the first to echo the well-merited acknowledgments you have so generously expressed in connection with their services, both at the mine and in the field of action. I have much pleasure in seconding the resolution. (Applause.)

Mr. Andrew Cohen.

Mr. J. Andrew Cohen, in supporting the adoption of the report and balance sheet, said: After such an able and exhaustive review of the company's affairs by the chairman, and the support accorded same by my friend, Mr. S. C. Black, if I were to follow precedent, the adoption of the main resolution for which this meeting has been called might well be left in the hands of shareholders. I feel, however, that some words of appreciation of and recognition of the services rendered by all those officials, both technical and clerical, who have so largely contributed to the company's success are due from those of us who have had an opportunity of studying the work performed by them during the past year. You, sir, although associated with the directorate for many years, have only recently assumed the honoured, although responsible, position of chairman. It is no idle phrase to say that to guide your colleagues in their endeavour to assist the management in controlling the affairs of one of the largest and perhaps the most successful gold mine on these fields, carries with it a responsibility of no mean importance; and, in endorsing to the fullest extent the panegyric accorded the work of our past chairman, Mr. Schumacher, both by yourself and Mr. Black, I for one feel that in you the company has found an able successor. Thanks to the progressive policy of your group, an opportunity has been afforded me of visiting the mine, accompanied by Mr. Stuart Martin, to whom my thanks are due for the assistance he kindly rendered in explaining the work that is being carried on, both underground and on the surface. This has enabled me to obtain a more intimate knowledge of the mine than would otherwise have been possible. After a close study of the assay plans and workings, if I say that you have been cautious in the review of the circular shaft development I express an opinion based on an impression gained as to the values already disclosed and the evidence supporting same. Now, what are the facts? Up to June 30, 1915, approximately one million tons of ore had been partially developed, the value of which could not be determined, as the necessary connections had not been made. Since then approximately a further 600,000 tons have been partially developed, making in all a total of 1,600,000 tons of payable partially developed ore, of an average assay value of 6.6 dwt., showing conclusively that, as the drives drift east and west of the shaft, good values are being encountered. Is it therefore unreasonable to assume that when more work has been done here and the drives extended laterally towards the Van Ryn Deep property, where we know big reefs of very high-grade ore have been disclosed in what is known as the eastern area of that company's property, similar results will be encountered in this company's western area? Indeed, I would venture to say that everything points to the circular and No. 2 vertical shafts disclosing ore equal to, if not in excess of, the average value of what hitherto has been considered the richest portion of the Modderfontein Mine. After all, when dealing with the circular shaft development, what is a million and three-quarter tons compared with the total tonnage disclosed of high-grade ore throughout the whole mine, when one considers that to the east, west and south of the circular shaft the largest area of your company's property has still to be attacked? If I have indulged in incorrigible optimism, it is because of my unfailing belief in the property as a whole. With these few remarks I have much pleasure in supporting the adoption.

The motion was then put and carried unanimously.

The retiring directors, Messrs. S. C. Black and S. C. Goldmann, were re-elected, there being no other nominations.

The auditors, Messrs. C. L. Andersson and Co. and Deloitte, Plender, Griffiths, Annan and Co., were reappointed, and their remuneration for the past audit was fixed at 350 guineas each.

NOURSE MINES.

SOUND WORKING POLICY.

DEVELOPMENT RESULTS.

The 19th ordinary general meeting of the Nourse Mines, Ltd., was held on November 24. There were present: Messrs. H. C. Boyd (chairman), F. Raleigh, S. C. Black, W. T. Graham, W. H. B. Frank, C. Meintjes, B. Moses, F. H. Barry, H. J. McCormick, F. Oates, S. M. Nelson and S. C. Steil (secretary), representing 484,828 shares out of the total issue of 827,821 shares of £1 each.

The Chairman said:—Gentlemen,—During the 12 months covered by the directors' report and the accounts submitted for your approval the labour supply showed a marked improvement over that of the previous year, and consequently 62,600 tons more were milled, but it was never sufficiently plentiful to enable the mills to be worked to their full capacity, and an average of only just over 50,000 tons were milled monthly. Owing to a falling off in the grade in the sections of the mine stoped, and the lower values disclosed in the course of development, the yield per ton milled decreased by 2s. 1d. to 26s. 3d. Working costs were only 3d. per ton less, but development increased by 6,500 feet, including 1,340 feet of incline shaft sinking. There was considerable expenditure on underground equipment of the South Nourse section and on general maintenance; increased cost of mining stores and allowances to employes on military service must also be borne in mind. The above facts explain the drop in the working profit for the year to just over £158,000. The increase in donations is due to contributions to various war relief funds, the giving of which we are sure will meet with your hearty approval. After providing for these and for the assessment under the Phthisis Act, appreciably less than for the preceding year, and allowing for sundry items of general revenue, the net profit for the year was £151,625. On balance, capital expenditure was negligible; the amount provided for Government taxes, a little over £21,000, includes our estimated share of the special war levy for the year ending March 31 next; 13¾ per cent. on the capital was distributed in dividends, and we carried forward an increased credit balance of £112,894, of which cash amounted to over £65,000; the value of stores and materials on hand was nearly treble the usual amount—the necessity for this in these times will be obvious. You will have noticed that the working expenditure at the mine is shown in a different form in these accounts, being divided into the direct headings of wages, stores and other costs, instead of as formerly the departmental headings of mining, reduction and general expenses. Our experience bears out that of other companies which had previously adopted this system and found that it afforded greater facilities to all concerned for effectively following and controlling the expenditure.

Faulted Areas.

In considering the technical reports, which give full details of the past year's work, it is to be noted that while the amount of development increased largely, as mentioned above, the payable ore exposed was considerably less than that disclosed by the smaller footage in 1913-4, while the average value was estimated to be only 5.5 dwt. per ton over the stoping widths assumed. A large amount of exploratory work had to be done in faulted areas, and the percentage of payable ore found, compared with the total reef exposures, was just under 45 per cent., but in connection with this it must be borne in mind that a large footage was driven on the Main Reef, chiefly with a view to permitting development of the Leader by crosscut raises and not merely in the expectation of exposing payable Main Reef. While the Main Reef showed a fractional improvement, both the Leader and South Reef values decreased materially.

In recalculating the ore reserves at the close of the year, slightly greater widths were allowed for, and to some extent to this, but mainly to the scale of operations, is to be ascribed the increase of 478,000 tons. The average value of the whole reserves was estimated to be 5.7 dwts. per ton, the large proportion of main reef being only 5.1 dwts. The most serious falling off in value is in the south reef, which is over a pennyweight per ton lower. This reef, as you are aware, has hitherto been the most profitable in the mine, but the best of it has gradually been worked out in the course of years and has been replaced by ore of lower value. Even to-day, we are mining this reef slightly in excess of its proportion to the rest of the reserves. The average value of the reserves in the South Nourse section was calculated to be 5.2 dwts. per ton, the main reef being much the same as in the rest of the mine, but the leader and south reef continue to be, as I mentioned last year was the case, each a pennyweight per ton lower. It will be clear to you that dealing with such low gold contents throughout, a considerable amount of the ore included in the reserves shows but a small margin of profit.

Hammers Instead of Machines.

The mine is now in possession of an ample labour supply. During the first four months of the current financial year, 58,000 tons have been milled monthly, and costs have been reduced to a little under 20s. per ton, but the yield has fallen to an average of 24s. 1d. for the period, and consequently there has been no improvement in the profits. For the first time for many years, a large percentage of the ore is being mined by hammers instead of machines. Stoping widths have already been reduced somewhat, but the grade has not responded to the extent anticipated. This has been receiving the unremitting attention of the management and the consulting engineer for some time, and it is clear that we are not recovering the value called for from the ore so far mined this year. Efforts will be made to maintain our present reduced stoping widths which must favourably affect the recovery value of the ore mined, but from all that we can see it would be well not to count on any material improvement in recovery from the present reef exposures. In seeking for enhanced profits compared with those at present being earned, we must rather look to possible reduction in working costs, in which further concentration of the mine workings will be an important factor, but will take time to effect, and eventually to the development of higher grade ore in the newer portions of the mine. The South Nourse shaft has now been sunk 1,450 feet, and will be continued as rapidly as possible. The amount of lateral development from this shaft is not yet great, but there are at present promising indications of improvement in the south reef in the western half of the area below the 20th level drive. In order to open and test the ground more rapidly, levels will from now be driven in the first instance alternately on the south reef and main reef. As is stated in the report just issued for the quarter ended 30th September, the amount allowed for realisation charges on the gold produced from mid-October, 1914, to the end of last August has, owing to unforeseen conditions created by the war, proved to be insufficient. An amount of over £6,000 must therefore be provided in this year's accounts. From September, the value of the gold for which credit has been taken has been proportionately reduced.

Volunteers.

In common with other mines, we have allowed all employes who can possibly be spared, irrespective of whether they have to be replaced, to join the military forces; 40 are at present on active service, and doubtless others will wish to respond to the call now being made for East Africa. As you are aware, the places of those who go with permission are kept open for them; up to half-pay is allowed to men who are married or otherwise have dependents, while single men without dependents receive quarter-pay. Much as we respect those who go on active service we must equally commend those who, often unwillingly, remain to carry on their important work of gold production: they have continued to subscribe in the most generous manner to the various war funds.

Mr. R. A. Barry resigned his position as manager at the end of last August, having been offered the general managership of the Transvaal Gold Mining Estates, Ltd. We wish him every success in his new work. Mr. W. W. Lawrie has been appointed in his place, and we are confident that he will render valuable service in his undoubtedly difficult task. The mine staff has worked very keenly under discouraging circumstances, and our thanks are due to them for their loyal efforts.

I now beg to move that the directors' report and the accounts for the year ended 30th June, 1915, be received and adopted.

Mr. Meintjes seconded, and the motion was carried.

Messrs. H. C. Boyd and E. J. Renaud, the retiring directors, were re-elected, there being no other nominations.

Messrs. C. L. Andersson and Co. and J. N. Webb were reappointed auditors, and their remuneration for past audit was fixed at 250 guineas each.

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THE GENERAL GARAGE.

The Last Word in Modern Automobile Enterprise and Equipment.

OUR reporter had an opportunity, a few days ago, to inspect the premises of the General Garage, in Motor Block, Marshall Street. This is one of the more recent of the many garages which have sprung up like mushrooms during the last few years in Johannesburg. Its equipment, like that of several other leading establishments, gives the impression that the horseless age has really arrived. On the two floors of its finely constructed building there is space for housing and caring for forty or fifty cars, and a good sized basement provides a stock room and space for a 500 gallon "Bowser" petrol tank, as well as for a motor-generator set, used for charging electric commercial vehicles, which are a specialty of this garage. Four charging plugs and necessary electrical accessories are provided on the main floor for this class of vehicle, enabling the patrons of the garage to secure full service for their electric vehicles. At the rear end of the same floor there is a very substantial modern lathe, with direct coupled electric motor. This is really a beautiful machine, and appears capable of turning out most accurate work. It is flanked by tool grinder, drill-press, and other tools usually required. The upper floor is reached by a stairway and by an inclined plane and is intended principally for housing new cars and cars in storage. The General Garage is agent for:—The General Vehicle Co. (commercial electric vehicles); The Franklin Automobile Co. (makers of the well-known Franklin "Six-Thirty"); The Milburn Vehicle Co. (makers of light electric pleasure and commercial vehicles); and last but by no means least, for Dodge Brothers, of Detroit. "G.V." electrics are already well known in South Africa and on the Rand. Three of the leading mines have each a 3½ ton "G.V.," and the S.A. Railways have eleven of the same size, while in all about twenty of various sizes are in operation in various parts of the country. It is claimed that no cheaper form of transport is to be found. Of the Franklin, little need be said, as its fine appearance and performances are well known. It holds the speed record from here to Capetown and also to Lourenço Marques. It has been chosen as the "scout" car for a projected expedition into Portuguese East Africa, when it will doubtless encounter all the difficulties which any car has ever been put up against. The Milburn light electrics, which are due to arrive within a few weeks, will be something rather new on the Rand, although such cars are used in thousands in American cities. Their field is especially that of town use, but their beauty and ease of control should make them popular for ladies. At the same time, the cost of running a Milburn is said to be quite nominal—probably not over £2 or £3 a month. The Dodge car has been seen already in Johannesburg, creating much interest and receiving very favourable comments. It is a four-cylinder, 30 h.p. five-seater car, which is quite the last word as to finish and design. It has, as a matter of course, electric lights and self-starter. Perhaps, however, its most remarkable feature is that although it looks and runs like a £500 car it sells in Johannesburg for £285. Large stocks of "Dodges" will be arriving early in the new year, and if the enthusiasm of the agents is well founded, we shall soon see many of them on our roads. To sum up, the General Garage is a most interesting place, which will well repay a visit by anyone interested in one of the most surprising facts of the day—motor transport.

Miners and Minister.

DEPUTATION TO MR. MALAN.

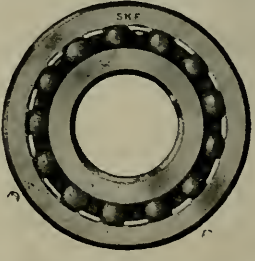
The Minister of Mines, Mr. F. S. Malan, received a deputation from the South African Industrial Federation to discuss the position of the coal-mine workers and other matters affecting trade unions. The deputation consisted of Messrs. A. Crawford (secretary of the Federation), J. Forrester Brown (general secretary of the Miners), R. Miller (organising secretary of the Amalgamated Society of Engineers), and J. Pender (business agent of the Amalgamated Society of Carpenters and Joiners). Mr. Malan was accompanied by Mr. Warington Smyth, Secretary of the Mines Department. The first matter discussed was the negotiations regarding wages and condition of the Witbank coal miners, and the Minister promised to use his best endeavours to bring the men and the owners together. The men ask for a 50-hour week and the war bonus, as agreed to by the Chamber of Mines. The deputation next raised the question of the movement for the manufacture of munitions of war in South Africa, and asked that the worker should be represented on the conferences. The Minister pointed out that so far it was purely a matter for the scientific men, and that the trade unions could not have been of any assistance in the meetings which had been held. With regard to industrial legislation, the deputation asked that the heads of the unions concerned should be consulted by the Government. They argued that they were in the best position to know the requirements of any trade or calling, and should have an opportunity of expressing their opinions on any proposed laws. The Minister agreed to do this and expressed pleasure at being given the opportunity of doing so. The next point raised was the necessity for having working-men inspectors on the mines. The Minister said that he had, in the previous estimates, made provision for three working-men inspectors, but owing to the war and the condition of the country's exchequer he had been compelled to drop that. But he saw no reason why any vacancy which occurred should not be filled by a worker, and he would give that his consideration. In arguing the point, Mr. Forrester Brown quoted from Mr. Joel's speech at the Johannesburg Consolidated meeting, in which Mr. Joel referred to the fact that the present number of inspectors could not possibly see to the enforcement of the regulations. Mr. Brown also brought up the plight of miners' phthisis men who had received their £400 and could not obtain further employment. He quoted a number of cases within his own knowledge, and urged the immediate alteration of the law. Another question raised by Mr. Brown was the position of men who had received only £96, but who were at the front and were unable to apply for the additional hundred within the specified time. The Minister promised to give these matters his attention.

ANSWERS TO CORRESPONDENTS.

"Small Man."—Nothing has been decided yet. We shall certainly return to the subject.

"Rhodesian."—The address is Lewis and Marks' Building, Market Square, Johannesburg.

"Coal."—If you send a copy of the prospectus in question we might be able to advise. The promoters evidently desire to keep the flotation private.



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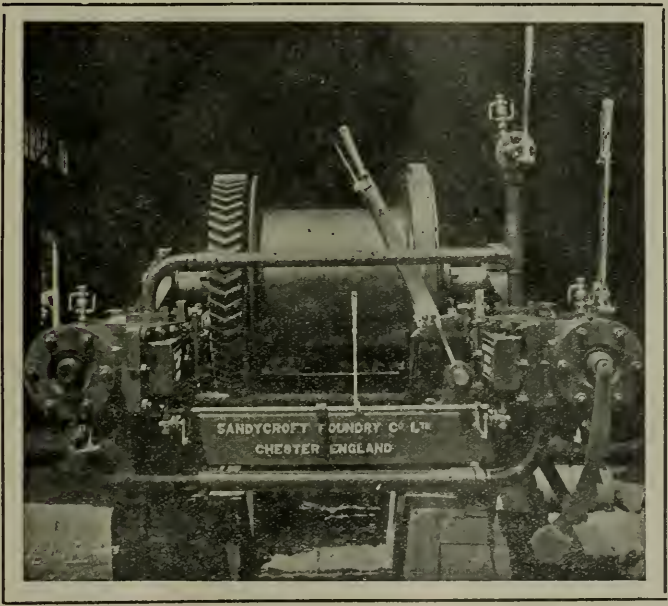

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PREPARATION OF LARGE-TYPE BOILERS FOR TEST—III.

[BY H. MARTEN.]*

Some further particulars of the test are as follows: The thickness of the fire was 4$\frac{3}{8}$ inches on the left-hand grate, but, owing to the feed bar not being level by $\frac{5}{8}$ of an inch, was 5 inches at the right-hand side of the right-hand grate. Some trouble was experienced with this grate in consequence, as a change of thickness of $\frac{1}{8}$ of an inch is sufficient to make or spoil a fire. This matter has been remedied. The grates were run on third and fourth speeds, and the difficulty with the thickness of the fire on the right-hand grate was reflected in the changes of speed. There were 19 changes in the left-hand grate, and 29 in the right-hand, and, whilst the left-hand grate ran 320 minutes on third speed and 70 on the fourth, the right-hand grate ran 176 minutes on third and 214 on fourth. The draught in the uptake above the economiser was read on an inclined water gauge, giving a magnification of 4. and remained steady to within about 0.01 of an inch at 1.00 inches. The draught was also taken in the space above the arch with a two-liquid gauge with the same magnification. The draught in this position varied from 0.37 to 0.40 inches. The drop in pressure through the whole boiler was, therefore, 0.6 inches of water. The louvres on the left-hand grate were kept open throughout, but the left-hand louvre of the right-hand grate was kept closed to equalise the conditions caused by the uneven fire. The riddlings through the grate were not burned during the test; the ash pits were cleaned at 9 a.m., half an hour before the test began, and again at 4.30 p.m. The weight of riddlings was 4,200 pounds, or 560 pounds per hour, and this weight has been subtracted from the total coal burned. The ash hoppers were emptied at 9.30 a.m., when the test started, and during the test the ashes were quenched and collected in a heap on the floor and afterwards weighed, sampled and analysed. The total weight of quenched ashes was 8,930 pounds, containing 29 per cent. of added water. This makes the weight of dry ashes 6,340 pounds in 6½ hours, or 975 pounds per hour. As the coal burned was 6,020 pounds per hour, the proportion of dry ashes collected was 16.2 per cent. The analysis of the coal and dry ashes was:

	Coal. %	Ashes. %
Moisture	3.4	0.2
Volatile Matter	22.8	1.0
Fixed Carbon	58.8	18.0
Ash	15.0	79.9
	100.0	100.0

The percentage of unburned carbon in the ash shows that about 5 per cent. of the original coal was passing over the back of the grates still unconsumed. The percentage of CO$_2$ averaged 13 per cent. throughout the test, which is equivalent to 16.5 pounds of gases per pound of feul. The mean temperature of the uptake was 170°C., and of the air in the boiler house 38°C., the temperature rise being 132°C. The energy loss through the gases was therefore 0.28 kilowatt hours per pound coal. The energy distribution is thus:

	Kw. hours per lb.	%
Energy to water	2.78	80
Energy to gases	0.28	8
Unburned fuel	0.17	5
Unaccounted	0.25	7
Total	3.48	100

Multiplying the energy in kilowatt hours per pound by the weight of coal in pounds per hour, gives the power in kilowatts:

	Kw.
Power to water	16,750
Power to gases	1,680
Power in unburned fuel	1,020
Power unaccounted	1,500
Total power on coal basis ...	20,950

The diagram shows the time at which each tank of 4,000 pounds of water was finished, and also of each 600 pounds of coal. At the beginning of the test the coal was entered when weighed out, but this was corrected at 10.15 a.m. The uniformity of the total water and total coal lines shows the regularity of the conditions of the test. From these lines the total water and total coal have been read off for each half hour, and then, after the coal has been corrected for the weights of riddlings, have been plotted against each other. The slope of this line gives the rate of evaporation in pounds, and the diagram shows that, whilst this was 7.21 over the whole test, it was 7.4 from 11 a.m. to 4 p.m., and rather lower for the first hour and a half of the test. The details of the temperature observations during the test are given on the diagram. The temperature of the furnace at the mouth of the arch was taken with the Fery radiation pyrometer, and only varied between 1,210°C. and 1,260°C. The temperature of the gases entering the super-heater was subject to considerable variations through the opening of the doors for cleaning purposes. The average temperature here was 675°C., but varied 40°C. on either side of this. The fluctuations are considerably reduced by the time that the gases leave the superheater, where the average temperature was 353°C. This may be rather too low for the general flow of gas, as the pyrometer was rather short, and the temperature taken was near the wall of the superheater. The temperature of the superheated steam in the header had an average value of 415°C., varying about 20°C. above and below. This is due to the variation in the temperature of the gases caused by the opening of the doors for cleaning. The temperature of the steam in the steam pipe was 10°C. below that in the superheater header. The temperature of the gases entering the economiser averaged 262°C., with a range of about 5°C., and the temperature of the gases leaving by the uptake was 170°C. The temperature of the water leaving the economiser was 92°C., with a range of about 5°C., whilst the temperature of the water entering the economiser was 46°C., and of the air in the boiler house 38°C. The calorie will heat one pound of water though 1°C. It is easy to remember that one kilowatt hour will heat one short ton of water though 1°C., but the ton is 5 per cent. shorter than the Colonial 2,000-pound ton—*i.e.*, it contains only 1,900 pounds. Since the temperature of the water entering the economiser was 46°C., the energy was 46/1,900, or 0.024 kilowatt hours per pound, and as the leaving temperature was 92°C., the energy was 0.048 kilowatt hours per pound. Thus the gain in energy in the economiser was 0·024 kilowatt hours per pound water, and the evaporation was 7.21 lbs. water per pound coal. Hence the contribution of the economiser is $\frac{7.21 \times .024}{3.48}$ or 5.0 per cent. The energy in the saturated steam leaving the boiler was 0.353 kilowatt hours per pound, or the gain in this stage was 0.305 kilowatt hours per pound. Hence the contribution of the boiler was $\frac{7.21 \times 0.305,}{3.48}$ or 63 per cent. The energy of the steam leaving the superheater was 0.410 kilowatt hours per pound, or the gain in the superheater was 0.057 kilowatt hours per pound, and the contribution of the superheater was $\frac{7{\cdot}21 \times 0{\cdot}057}{3.48}$, or 12 per cent. If the gain in energy at each stage in kilowatt hours per pound is multiplied by the weight of water in pounds per hour, the power of each stage in kilowatts is obtained.

	Energy gain.		Percentage. %		Power. Kw.
Economiser	0.024	...	5	...	1,050
Boiler	0.305	...	63	...	13,250
Superheater	0.057	...	12	...	2,450
Total	0.386		80.0		16,750

That is, the total power rating of the boiler with its economiser and superheater is 16,750 kilowatts on the steam-energy basis. On the coal-energy basis it was shown to be 20,950 kilowatts. The older engineers liked to have their boilers rated in horse power (no doubt they would have used kilowatts if they had been accustomed to them), but their rating depended on the steam consumption of the engine to which steam was supplied by the boiler. Whilst imitating the older men in their desire to rate a boiler by power instead of weight of water, I would rate the boiler in this manner on the steam-energy basis, leaving the question of the availability of the energy to the makers of condensers, and the question of the utilisation of the available energy to the makers of turbines or engines. I would rate this boiler, for example, at $\frac{36{,}000}{43{,}450}$ of 16,750 kilowatts, or at 14,000 kilowatts, using the manufacturers' rating of 36,000 pounds per hour, in place of the 43,450 pounds evaporated on test. Finally, I must thank Mr. Bernard Price for the facilities granted, and Mr. G. M. Clark for valuable suggestions in the preparation of this paper.

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*From paper read before S.A. I. of E.

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CONTENTS.

PAGE
Notes and News 311
Topics of the Week:
The Select Committee on Miners' Phthisis 313
The Far East Rand Again 314
The Low Quotations for Tin Shares 314
Rooiberg Position and Prospects 315
German Patents and Trade Marks 316
Mine Ventilation: An American Example 317
Moving Ore in Flat Stopes 318
Chemical Trade and the War 319
Correspondence and Discussion: "Canadian State Enterprise"; "Far East Rand"; "Transvaal Tobacco for Our Troops"; "Coal Prospects in the Karoo" 321
Suggestions for a New Gold Law 323
Economic Crisis in S.W. Africa 324
Gold Fields Annual Review of Rand Mining 325
Rhodesian Section:
Mineral Output for October 327
Latest Mining News 329
Yield, Costs and Profits in October 330
The Week in the Mining Material and Engineering Trades 331
The Week in the Sharemarket 333
Commerce and Industries 334
Electrical Notes 337
Engineering Notes and News 338
Company Meetings: Consolidated Main Reef; Main Reef West; Lace Props.; Transvaal and Delagoa Bay ... ... i.

Notes and News

De Beers. It is rumoured that at the forthcoming meeting of De Beers the chairman will be able to announce that as the directors have been able to make frequent sales of small parcels of diamonds, something like half a million sterling of the funds which were rendered immobile twelve months ago has been set free, and that the preference dividend will be paid. The knowledge of this fact seems to have been the mainspring of the recent buying by certain persons in London. The diamond market is still a very long way from normal. De Beers is said to have still a large stock of diamonds on hand, and the trade is also well supplied.

* * * *

The Chartered Meeting. It is hardly likely that the annual meeting of the Chartered Company, which last year was held in December, will take place earlier than February next. The return to London of the present visiting directors, Sir Starr Jameson and Mr. D. O. Malcolm, cannot be expected for at any rate three months. Happily, the mining industry is little affected by the war. The gold output for October constituted a record, and the returns for the first ten months of the current year exhibit substantial improvement on comparison with the production for the corresponding period of 1914.

* * * *

Land Transactions in the New Protectorate. In the House of Assembly last week, the Minister of Agriculture, in reply to Mr. Madeley, said he understood that the South African Territories, Ltd., had published an advertisement offering certain land owned by it in South-West Africa for disposal, but he informed the hon. member that, in any case, as the Deeds Offices in South-West Africa were only open for the purpose of supplying information to the public, and not for the registration of deeds, etc., no transactions affecting land could be registered at the present time.

* * * *

Zinc. In order to supply the European demand for spelter, it is said that the number of zinc retorts in the United States has been greatly increased, and mines that were shut down owing to inability to work at a profit are now being operated. By the end of the year there will be something like 160,000 retorts available, and as each can turn out over three tons of spelter yearly it will be seen that the United States dominates the spelter market. After the war no one knows what will happen, but a demand for the metal will exist, and the Americans who have built up a £20,000,000 zinc export trade are going to fight for its retention.

* * * *

The Rhodesian Record Output. The gold and mineral output from Southern Rhodesia for the month of October, full details of which appear in another part of this issue, has been officially declared as of a value of £394,860. This is the highest monthly total yet recorded, the previous highest yield having been declared in July, when the value was £390,793. The summary reads as follows:—Gold, £339,967; silver, £2,100; copper, £15,571; lead, £38; chrome iron, £21,750; asbestos, £3,596; coal, £11,760; diamonds, £78. As compared with the returns for the same month of last year the gold yield is practically identical with the record then set up, although the value of the yield is over £2,000 higher, this apparent discrepancy being due to the fact that in the month of October, 1914, the purchase price of raw gold was unexpectedly reduced by the banks by one shilling per ounce. The declared value being taken from the account sales, this explains what might at first sight be taken for a statistical inaccuracy. One of the main causes of the establishment of the new record is the fact that, in view of the demand occasioned by the war, the price of chrome iron ore has advanced, and owing to increased facilities freights are more easily dispatched to the munitions centres. From what one can ascertain there is no reason why the present rate of production should not, at an early date, be accelerated.

An Income Tax Problem. In a considered judgment in the case of the Commissioner of Taxes v. Messina (Transvaal) Development Co., Ltd., Sir John Wessels, in the Supreme Court on 22nd November, said it appeared from the stated case that the company was an English one, carrying on mining operations in the Transvaal. It also carried on, here and elsewhere the business of purchasing stock and shares and of lending money. In furnishing particulars under the Income Tax of 1914 the company deducted £41,818 15s. as a proportion of loss in respect of money lent by the company in London, and certain moneys deposited with London bankers who failed. The Income Tax Commissioner contended that such deduction should be disallowed because (1) the loss was not occurred in the Union by the taxpayer in the production of his taxable income, and (2) because the loss was loss of capital. The solution of the first question depended on the correct meaning of section 14 (1) (a) of Act 28 of 1914, taken over from the New South Wales Act. The original was obscure; so was the copy. His Lordship proceeded to deal with the section in detail and held that only such losses and outgoings could be deducted as were incurred in the Union. The loss of outgoings which the taxpayer sought to deduct consisted either of capital loaned or deposited, or both. The decision on the second point was based upon a decision of the Supreme Court of New South Wales in the case of Foreman v. Commissioner of Taxation, in which a person sought to deduct a loss incurred from an investment, in order to ascertain his taxable income, but the Court held that income invested became capital and could not be deducted. On money had been earned as income the onus of showing that income tax need not be paid upon such income lay upon the taxpayer. The loss which the respondent sought to set off was prima facie a loss of capital and not a loss incurred in the Union in the production of the taxable income.

* * * *

Copper. The splendid rise in the price of copper means much to Messina, Namaqua and Cape copper companies. After a period of hesitancy the copper market has again shown a renewal of vigour induced, as usual, by the buoyant reports coming to hand from the United States, and the renewed advance in the prices quoted by producers in America. From London we learn that the supplies of copper have lately been drawn upon very considerably, and the total now stands at a dangerously low level, which has induced those with speculative commitments open on the "bear" side of the market, to cover. The fact that further quantities of rough copper have been shipped to America for conversion is being sharply criticised by the English refiners, who seem to have good grounds for their belief that the Americans are now seeking to manipulate the market upwards by their process of fictitiously diminishing the European visible supply. It was all very well, and a perfectly legitimate transaction, to withdraw rough copper from England for conversion into refined in America, so long as American supplies of rough copper were deficient, but whatever may have been the case six months ago this is certainly not the position to-day, for America is accumulating rough copper at a considerable rate, and must now hold comparatively fair reserves of this class of material. It is likely that strong opposition will be forthcoming should this fictitious drain upon supplies be persisted in, and the attention of the authorities might very well be called to transactions of this kind. There is, of course, a big consumption of copper going on, but it is practically centred now upon the provision of war supplies, while the execution of commercial orders becomes a more and more difficult matter owing to the contradictory attitude of the Government Departments, one section of which will issue permits, which another Department cancels or refuses. The Australians are quite determined to retain the whole of their metal industries in their own hands, but the functions of the Australian Metal Exchange which has recently been formed appear to have been rather misunderstood. This institution will have nothing to do with buying and selling as such, but will be merely a channel through which all transactions in Australian metal products must be registered for approval before deliveries or shipments can be made. The regulations which have been drawn up and approved, require that every contract entered into must be registered with the Attorney-General of the Australian Commonwealth, and that a copy of such contract, whether in the form of a letter, cable or formal agreement, together with a statutory declaration of accuracy, must be registered within 48 hours. The only exceptions made are with regard to business within the Commonwealth, for which registration is not obligatory when the transaction involves an individual payment of less than £500. Meantime, all metal and ore exports from Australia are forbidden, unless with the consent in writing of the Minister of Customs.

* * * *

The Manufacture of Munitions. In the House of Assembly last week, Mr. Rooth asked the Minister of Mines and Industries: (1) Whether a Commission has been appointed by the Government to inquire into and report upon the adoption of special means for fostering and encouraging various industries in South Africa, including the manufacture of munitions of war; (2) whether such Commission has yet submitted a report in connection with its inquiry; if so, (3) whether, in the event of such report not yet being ready for presentation to Parliament, the Minister is prepared to give the House a summary of the conclusions arrived at by the Commission; and (4) whether the Government intends at an early date to take any further steps or action with a view to fostering and encouraging local industries, and, if so, what steps or action? The Minister of Mines replied: (1) As the result of a meeting including representatives of commerce and manufactures from all important centres in South Africa, held at Johannesburg on November 3, 1915, to consider questions with regard to production in this country, a Central Committee has now been formed under the chairmanship of the General Manager of Railways for carrying out the objects of the original meeting, and sub-committees have been appointed in the different manufacturing centres. (2) The committee is still in the early stages of its work and has not reported. (3) The committee has not yet arrived at any conclusions which can be given to the House. (4) The committee is engaged in preparing a preliminary report dealing with the ability of the engineering workshops of this country to undertake work which will tend to relieve the workshops in Great Britain from carrying out orders for South Africa—this being the direction in which the Minister of Munitions in England has asked for the assistance of this country. It is not possible at the present state to make any further statement as regards probable Government action.

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Bogus "British Companies." In connection with the establishment by the Government of the Melbourne Metal Exchange, the Federal Attorney-Keneral (Mr. W. M. Hughes) has approved of the following definitions of "British Firm" and "British Company." A "British Firm" is defined as one all the partners of which are British subjects, and a majority of the partners of which are natural-born British subjects, and approved by the Federal Attorney-General." A "British Company" is defined as a company incorporated in the British Dominions, all the directors of which are natural-born British subjects, and at least four-fifths of the shareholders of which are British subjects resident in the British Dominions. At least four-fifths of the capital of such company must be owned by British subjects, and the company must not be mainly controlled, directly or indirectly, by the subjects of any foreign country. The Attorney-General has also approved of the following recommendations made by the sub-committees: "All export business to be registered. Unsold parcels to be declared, and undertakings to be given to register within forty-eight hours of receipt of advice of sale of any portion of the parcel. With regard to business within the Commonwealth, it should not be obligatory for transactions which involve an individual payment of less than £500 to be registered. In the case of Customs smelters, chemical works, and similar general works, registration may be made monthly. A formal declaration to be made by the Attorney-General throughout the Commonwealth, so that all concerned may be acquainted with requirements of registration." A proclamation was recently issued by a special meeting of the Federal Executive Council, presided over by Mr. F. G. Tudor (Minister for Customs), prohibiting the export from Australia of metals, alloys, and minerals unless the consent in writing of the Minister is first obtained.

TOPICS OF THE WEEK.

MINERS' PHTHISIS ENQUIRY.

The Union Assembly has appointed another Special Committee on Miners' Phthisis, which is to report before the end of the present session. The Special Committee will take evidence in Johannesburg during the coming holiday recess—which is expected to last about a month—and the terms of reference and personnel are alike noteworthy. The former in their finally amended form are as follows:—"That a Select Committee be appointed to inquire into the working of the Miners' Phthisis Act, 1912, and the Miners' Phthisis Act Amendment Act, 1914, with a view of ascertaining: (1) Whether the mines scheduled under the Miners' Phthisis Act, 1912, are fully equipped with water and the necessary appliances for using it at working faces and elsewhere where dust is raised; (2) whether the compensation at present payable under the Miners' Phthisis Acts is adequate, and, if not, whether the existing money grants should be increased, or what provision should be made in other ways for enabling beneficiaries to maintain themselves and their dependents; (3) whether the administration of the Miners' Phthisis Board cannot be improved so as to obviate delays in dealing with applications, and to furnish more adequate statistical information as to the incidence of the disease and the condition of beneficiaries; (4) whether further, and if so what, provision is required for cases where all the compensation due under the acts has been paid, but where sufferers or their dependents are still living in destitute circumstances; and (5) in what other respects, if any, Miners' Phthisis Acts or the Mines, Works and Machinery Act require amendment so as to reduce as effectively as possible the prevalence of the disease and to ameliorate the condition of those affected by it." The Special Committee consists of the Minister of Mines, Major Sir Abe Bailey, Dr. De Jager, Messrs. Geldenhuys, Lieut.-Colonel Dr. Davies, Messrs. Sampson, Roos, Rev. Mr. Van der Horst, Sir Willem van Hulsteyn, and two others to be elected. As our columns have shown, Miners' Phthisis has engaged the attention of Parliament repeatedly in the past five years. Select Committees have been appointed; inquiries have been held; and an immense mass of Parliamentary literature has accumulated around one of the most distressing problems which a country has ever been called upon to face. According to the excellent *Cape Times* report, from which we quote, on the first day of the session motions on the subject were brought forward from three different sections of the House. Sir Willem van Hulsteyn tabled a motion asking for the appointment of a Select Committee to inquire into the working of the two Acts which govern compensation to sufferers from the disease, while Mr. Duncan from the Unionist benches, and Mr. Sampson from the Labour benches, also brought forward important proposals. These, originally in the form of independent motions, were finally introduced as amendments to Sir Willem's proposal for a Select Committee. Mr. Duncan preferred a Commission, and his amendment enumerated the special points of inquiry which the Commission should examine. Mr. Sampson's amendment asked for an immediate increase of the scale of compensation and that the mine owners should bear the whole burden of compensation. A third amendment was introduced and carried by the Minister of Mines, Mr. Malan, suggesting that Mr. Duncan's special points of inquiry should be incorporated in the reference to Sir Willem's Select Committee. Mr. Duncan, in pleading for a Commission of Inquiry, urged that a Select Committee would be much hampered in its task by the intervention of the Parliamentary recess and by the difficulty of obtaining evidence a thousand miles from the real centre of the disease. It was, he held, most important that those selected to inquire into the disease should be able to get first-hand information as to the conditions on the mines. He suggested that an unpaid Commission would report very speedily, and in elaborating the points emphasised in his amendment, spoke with deep sympathy of the destitution and the suffering which miners' phthisis has brought into being. Mr. Duncan was not prepared to say that the scale of compensation was adequate or inadequate. It was easy, he remarked, to promise at election time that the scale should be raised. This, however, he had refused to do, for the simple reason that at present there was insufficient evidence upon which to base a judgment. Mr. Duncan insisted that the whole problem was essentially a South African problem, and demanded that whatever might be done to remedy the defects of the existing Acts it should be done quickly. For this reason he held that a Commission was preferable to a Select Committee, and in this view he was supported by Dr. Davies. The Minister of Mines, who spoke on the question with much sympathy, touched on the extreme difficulty of settling miners suffering from phthisis as small agriculturists. Several members had spoken of the necessity for improved inspection. Mr. Malan gave figures as to inspections during September. There were 59 of these, and 394 different working places were inspected. As a result, 120 convictions were secured, 109 being against natives. Mr. Malan pointed out that the danger from blasting—the fumes and the dust created—constitute vastly the greatest danger. Sir Willem van Hulsteyn, in introducing his motion, stated that last year awards were made to the amount of £448,000; 2,043 men were compensated; and the number of sufferers on the books of the Miners' Phthisis Board was no less than 4,236. Sir Abe Bailey, who also contributed to the debate, gave some impressive figures. Since the Compensation Acts came into operation, he stated that 8,750 applications have been received, and 4,900 men have obtained awards, the total sum paid out being, roughly, £2,018,000. Dealing with Mr. Sampson's demand that the mines should bear the whole burden of compensation, Sir Abe pointed out that, of the 42 mines working to-day only 30 are paying dividends, and of these 13 have only ten years' life remaining. The result of imposing additional burdens on the mines would be, he said, that some of them must close down. On the whole, the prevailing note throughout the debate was one of deep human sympathy with the victims and determination that Parliament should leave nothing undone to ameliorate their condition, and to prevent the further development of the disease. General Botha described the problem as one of national importance demanding the closest attention. He thought that the measures thus far taken had not been sufficiently drastic, and, while recognising the economic importance to the country of the mining industry, declared that no industry, however important, should cost so many lives. The House adopted Sir Willem van Hulsteyn's motion for a Select Committee, as amended by Mr. Malan, this amendment referring to the Committee the specific points which Mr. Duncan had suggested that a Commission should investigate. Though it is safe to say that it would have greatly preferred a Commission entirely composed of men fully acquainted with mining, the industry will doubtless accept with equanimity the proposed hasty enquiry, despite the uncomfortable prospect that the result may be merely more legislation in a hurry.

THE FAR EAST RAND AGAIN.

The chief disappointment in the programme of new legislation for the present session, outlined by the Government during the week, is the absence of any reference whatever to measures concerned with the opening up of the Far East Rand. While the projected expedition to East Africa remains the most vital business of the moment, and Johannesburg in a spirit of splendid patriotism has given itself up completely to the wave of recruiting enthusiasm, it must not be forgotten that Parliament owes us in return some thought for our future. It is not as if the time of the present session were wholly required for the consideration of war measures. Ministers, as a fact, have announced a long list of new bills dealing with innumerable phases of more or less pressing legislation, mainly directed to the securing of uniformity and codification of Union statutes. Yet none of these measures, we venture to say, is more important than the reform of the Gold Law in so far as it continues to result in the locking up of the Far East Rand gold-bearing areas. The subject formed the theme of the Chairman's address at the annual meeting of the Lace

Proprietary Company last week; and afforded Mr. Dale Lace a congenial field for the exercise of his natural gift of eloquence. A full report of Mr. Dale Lace's speech will be found in this issue, and it may be commended to the attention of the Government and of those members of the Union Parliament who take an intelligent interest in this important question. The air is thick with rumours of what the Government means to do, of what this house or that proposes, and of great schemes for hastening the development of the Far East areas. But the Government gives no public sign, and, unless the matter is kept well to the fore, and hammered away at continually, there is a real danger that the Government action that is a necessary preliminary to work of any sort on those areas, may be postponed to the Greek Kalends. If our legislators must keep on talking—and, apparently, neither the great struggle in Europe nor the East African expedition can diminish their capacity for that —by all means let them have something constructive like the Far East Rand to talk about. It will again be objected, of course, that under present conditions no capital is available for financing operations. Even granting that, there is no reason why a beginning should not now be made with the breaking down of the legislative barriers that bar the development of the district in question. Mr. Dale Lace has done good work by retrieving the future of the Far East Rand from the "limbo of forgotten things," and the Union Parliament, it may be hoped, will vouchsafe again to take notice of a matter so vital to the future of the industry and of the country.

THE LOW QUOTATIONS FOR TIN SHARES

A CORRESPONDENT in our last issue raised the question of the low price of Rooiberg tin shares in particular and of all South African tin shares in general. The first part of the question is answered elsewhere in these pages, but the second calls for more extended reply. Compared with former prices, the quotations for the shares of all our producing tin mines are certainly most disappointing to-day; and shareholders, accustomed to the less violent fluctuations of gold shares, naturally ask the reason why. The fact is that the comparative stability of Rand gold shares has spoiled investors for the more speculative delights of tin mining company shares. The price of the latter, it cannot be too often repeated, is what mathematicians would call "a function of many variables," and a word may usefully be said here explanatory of those variables. Chiefly, they are two. Or, put in another way, tin shares are affected by all the "risks incidental" to gold mining, and in addition, by one or two peculiar to mining for tin. The first of these factors is the instability of the market price of the metal. This is a feature so novel not only to shareholders in this country, but also in the experience of directors, that there is a noteworthy reluctance on the part of the chairmen of tin companies even to discuss it at annual meetings. This diffidence, doubtless, will pass, as it comes to be recognised how largely the state of the market for the metal governs the profit-earning aspect of the company's affairs. For the life of us, also, we cannot see why the directors of a tin mining company should be any more squeamish than, say, the directors of a diamond mining company, in considering and discussing the market prospects for their product. Some day, perhaps, we may expect the directors of tin companies to frame their scale of production with an eye to the market, without feeling constrained to make any secret of the fact, though doubtless that day is still far off. To-day the cry seems to be that "the directors cannot gamble with the product of their mine" as though all selling of a product to the best advantage did not, in its essence, partake of the nature of a gamble. Admitting that this factor of uncertainty in the price of the metal affects largely the price of the shares, it will be seen at once why the quotations for our tin shares remain low. The price of tin, though better than the price obtainable immediately prior to the war—*i.e.*, £132 cash on July 30, 1914—is still far below the best of two years ago. Indeed, of all the largely used base metals, tin alone has failed to benefit very appreciably in price since the war began. The fact is illustrated in the following table:—

	July, 1914.	Oct., 1914.	Dec., 1914.	July, 1915.	Aug., 1915.	Sept., 1915.	Dec., 1915.
Copper, Standard, cash...	55¾	50½	56⅝	71¼	68⅝	72	79½
Copper, 3 months...	57¼	51¼	57	72⅛	69⅞	73	—
Copper, electro...	59½	52¾	60¾	87½	84½	87½	99½
Tin, Standard, cash	132	131	146	155	150¾	151¼	168¼
Tin, 3 months	135¼	132½	142	156	152	152	167½
Lead, prompt	18¾	17⅝	19	23⅞	22½	24⅝	—
Lead, forward...	18	17¼	18 15/16	23⅞	22½	23	—
Spelter, prompt	21½	24	27¾	100	74	68	—
Spelter, forward	21¾	24	27¾	85	70	62	—

Various reasons for the disappointing position of tin have been advanced, but all represent mere guesswork. It is notorious that there is far more gambling in tin futures than in, say, gold mining shares, and the price of the metal is the resultant of a big volume of conflicting speculation. Some say that the output of the Bolivian mines is being husbanded by United States financiers against the day when peace may bring in its train a greatly increased demand for the metal. Other speculators, aware of that fact, may be translating their knowledge into "selling short." The truth, doubtless, is that since tin, unlike other base metals, is practically all controlled within the British Empire, the Imperial Government has taken care that the price is kept within reasonable limits. That, however, does not preclude us from turning to account the vagaries of the market when they come our way. Consistent with that belief, this paper, in the dark days of the tin market just before the war, stoutly advocated the temporary closing down of the tin mines until such time as the price of the metal improved. The war supervened, and tin appreciated in price, though to nothing like the extent hoped for. Prophecy is not our line, but assuredly the price of the metal must, as a result of present happenings, improve, even though it may in the process be worse before it becomes better. The second factor peculiar to, and governing the price of, tin investments in this country is the more erratic nature of the ore bodies. Without labouring the subject, or drawing upon any of the wealth of evidence that might be adduced, it may be said that no tin mine in this country can boast an ore body possessed of anything like the consistency of our Rand reefs. How seriously the effect of these two factors is regarded may be judged from the market prices of the shares of our tin companies. By general consent, the market seems to regard a return of from fifteen to twenty-five per cent., say an average of twenty per cent., necessary on a South African tin share. Allowing, say, twelve per cent. for amortisation, the life of the mine has to be about seven years. It is not surprising, therefore, that quotations to-day stand so low, when we consider how precarious is the "life" of the best of our tin producers and how variable the market for the product. The sharemarket, after all, has its uses. It is a wonderful leveller, ever on the watch to put upstart stocks in their place. If the prices of our tin shares remain at a low level, we may be sure there is a reason. Whether it is a good and sufficient one we cannot say, until we know why and how long the price of the metal tin remains as at present, and how development at our tin mines will result.

British Central Africa.

The directors of the B.S.A. Co., Ltd., report for the 18 months to December 31, 1914, that the profit and loss account shows a profit of £52,052 for the period, including interest due on Shire Highlands Railway debentures, which sum, added to the amount brought in, viz., £179,795, has been carried forward. The board have received the second instalment due on account of subsidy lands, viz., £65,000. The cotton crop was very good, while tobacco crop, though fair, was inferior in quality. The store trade has been satisfactory and showed a good profit. The operations of the flotilla also were satisfactory, and a large amount of cargo was carried, including railway material.

POSITION AND PROSPECTS OF ROOIBERG TIN MINES.

Prospects of the Treatment of Alluvial—Reasons for Delay and Reduced Output.

A ROOIBERG shareholder put some pertinent questions in our last issue. He first asked us to state whether the company was in a position to start treating the alluvial now, and, what were the prospects of the property in connection with the treatment of the alluvial. He proceeded to state: "According to last annual report the dam was completed and the recent heavy rains should certainly have filled it with water. What is the anticipated output to be when working the alluvial in conjunction with the mine ground? Why has the monthly output dropped from 105 to 85 tons concentrates? Now that the price of tin is on the rise, don't you think it strange that the shares should be standing as low as 14s. 3d., for some time back the shares have been standing at about 14s. 6d., when tin was £150 odd per ton. Now that the price of tin is £176 15s. the shares are lower by 3d. Perhaps you can throw some oil on the troubled water." The fact that since the letter was written tin has been down to £161 per ton and up again to £166 conveys its own moral. From enquiries made, we learn that the recent rains have, as a fact, filled the dam, and that water shortage is not the cause of the delay in starting washing. The real cause is the delay in the delivery of the necessary washing plant, which, on account of the pressure of war work with the makers, has not been delivered up to time. When it does come, however, there will be no further delay in making a start. The reason why the monthly output dropped from 105 to 85 tons may best be explained by a quotation from the statement of the chairman at the last annual meeting, "Experience," he said, "has shown that as the mine increases in depth the tin contained in the ore is finer, especially in the Union Lode, which is the present principal source of production, and there is a higher percentage of pyrites; this fact increases the difficulty of extraction, and the existing slimes plant is unable to recover some of the fine tin." As a result of this position of things, it has been found necessary to provide a further increase of plant to treat the slimes. As Mr. E. J. Way explained in his report as consulting engineer, the final tailing has an average value of about 0.57 per cent. metallic tin, and of this at least 40 per cent. is a —200 product, and contains metallic tin of the value of from 1.0 to 1.4 per cent. In other words, 11.4 lbs. of metallic tin per short ton are escaping in the form of slime tin, equivalent in value, at £150 per ton, to 17s. per ton milled. It is obvious that the company is well justified in its determination to save some of this, even if considerable capital expenditure is involved in the undertaking. The question of the price of the shares involves the larger question of why the prices of tin shares generally should remain so low, and an attempt is made in our leading columns to set forth some of the considerations governing the phenomenon. The only other portion of our correspondent's letter dealing specifically with Rooiberg concerns the alluvial prospects. Now, though this paper at one time entertained high hopes of the profitable possibilities of working the alluvial, we can trace no official statement emanating from the company to support our views. Instead, we find on turning up the speeches delivered from the chair at the last three annual meetings, that the utmost the tin work from the alluvial was expected to do was to pay for the cost of prospecting the surface of the farm. At the annual meeting in 1913, Colonel Dalrymple said:

> I will now ask you to bear with me for a few minutes on a question which is exercising our minds very much at the moment, namely, the possibility of our being able to work the alluvial deposits at a profit, and, even if we fail to work at a profit, whether we should not adopt more up-to-date methods in baring formation in connection with our prospecting work, instead of the system at present in vogue, which is by the shovel only—a slow and tedious process. We have known for years that the surface soil of a great part of our holding contains tin; too low in grade to handle in our reduction works, but possibly profitable if sluiced for. As you are aware, we have no permanent running stream on the farms held by your company, and all water, therefore, which would be necessary for the above purpose would have to be conserved during the rainy season and economically handled during subsequent operations. The success of the present dam which supplies the works led us to have a complete survey made of the whole of our holding, which shows that we can construct dams at various points on the dry water courses which, together with our existing dam, would have a total capacity of some 150 to 200 million gallons of water. About 120 acres have been prospected by means of hand drills along the banks of the dry water courses, and the borehole results show assays varying from 0.1 per cent. to [illegible] per cent., and in some cases richer values. The borings were collected and roughly sluiced, and tin was actually won to the extent of [illegible] lb. of white metal per cubic yard. It is thought that with carefully designed appliances one pound of metallic tin could have been won to the cubic yard, which could, probably, with extensive operations, be made profitable. But the capital expenditure involved has made it necessary for us to go slowly at present. Quite apart, however, from any direct profit which we might make from the sluicing operations, we recognise that prospecting and exploration would be greatly accelerated if we could remove the overburden by means of water. This surface stratum varies in thickness from 5 to 12 feet, and consists mostly of decomposed sandstone, which is easily amenable to sluicing operations. Our present methods consist entirely of shovel work, and are laborious and slow in result. In fact, some of our most successful "finds" have been discovered after months of surface trenching in this loose sand, all of which could have been removed with a reasonable head of water in a few days. The rock would have been laid absolutely bare, thus probably exposing every crack and fissure; whereas now it is purely a matter of chance whether we uncover these fissures or not. In fact, trenches which have entailed a large amount of work have exposed nothing, whereas a few feet away another trench has uncovered most valuable tin-bearing lodes. It is estimated that by effective sluicing we could possibly uncover more country in a week than we at present do by shovelling in several months. So you will see that quite apart from the profit which might accrue from sluicing this overburden, we should actually be saving a large sum of money in the long run in carrying out our exploration and prospecting. There are, however, many things to be taken into consideration. In sluicing away large quantities of loose sand and other surface alluvial deposits, provision has to be made for the economical handling and placing of the tailings. The work has to be done systematically, and the lower portions of the farm would have to be treated first, so that as the lowest paddock was uncovered it could be used as a depositing site for the tailings of the next paddock above, and so on. Then it would be necessary to carefully safeguard our present water-courses so that they did not become blocked with debris. All these matters are receiving the most careful attention of your technical staff. Information is being obtained from other parts of the world where prospecting is being carried out in this way, so that if your board does decide, even on a small scale, to commence operations on these lines, the possibility of initial mistakes due to inexperience will be reduced to a minimum. It is quite impossible for us, at present, to give you reliable figures either on what you may expect as a yield from this alluvial, or whether it might be profitable in itself, or the amount of money which you may save by carrying out your prospecting operations in this present, attractive from both aspects. I have personally inspected dumps of sand at Rooiberg which have been cleaned out of prospecting works and which have shown excellent rich results of alluvial tin in the pan, and by washing the country clean in this way you will have to operate the rich and poor sands as they occur. This is not a scheme which can be put into operation without considerable delay, as we have to impound the water first, and this could not be carried out till this rainy season is over, hence water would not be available before the end of 1914 at the earliest. Your manager, Mr. Schoch, who has been on a holiday and returns this week, has taken advantage of his visit to the United States to investigate the sluicing problem and methods in that country, and we expect to have his views in front of us at an early date.

Again, at the annual meeting held on October 27th, he said: "At a meeting held in this room on the 29th October, 1913, I referred at considerable length to the question of alluvial deposits, and to the erection of a sluicing plant for extracting tin therefrom. Last year I pointed out that, while it did not appear likely that the process would pay for itself—in so far as the actual tin directly recovered was concerned—it was considered that this method of exposing the rock and thus revealing any pockets of ore and fissures which make their way to the surface would be so far in advance of the present method of excavating and baring the country rock by native labour, that the cost of the plant would soon be recovered indirectly, if not directly. It was with this in view that your board decided to construct a second dam, to which reference was made last year, and which has now been completed; and in anticipation of the dam being filled in the early part of the next rainy season, it was thought advisable to take the necessary steps to go forward quietly and erect a small sluicing plant." From these extracts it ought to be abundantly clear that the company in no way encouraged the building of high hopes on the promise of the alluvial. For unofficial, optimistic statements made two or three years ago—and it is not denied that they went uncontradicted—the company, of course, cannot be held responsible.

GERMAN PATENTS AND TRADE MARKS.

Transfer of Rights to British Firms— Chemical, Mechanical and Engineering Patents.

In the task of capturing German trade, to which the commercial interests of Great Britain have applied themselves since the war started, an important position has necessarily been assigned to the British Patent Office, which is the custodian of the rights of inventors—whether they be British, enemy or neutral—whose creations have found a place in British markets. To the Patent Office has fallen the duty of ensuring that those enemy inventions which are beneficial to the welfare of the people should continue to be worked in our interests, preferably by British capital, with the aid of British craftsmen. To this end the Comptroller-General of Patents (Mr. Temple Franks), with Sir Cornelius Dalton, his immediate predecessor in office, has sat almost continuously since the war began as a tribunal appointed to advise the Board of Trade upon the desirability or otherwise of transferring in individual cases certain rights under German and Austrian patentees to British subjects competent to utilise them commercially. Since the end of August, 1914, when the tribunal was constituted, 387 individual applications have been made to the Patent Office for licenses under enemy-owned patents. In some cases more than one applicant applied in respect of the same patent, and the number of patents concerned has been 294. In 245 cases licenses have been granted. Two patents have been definitely avoided, and for the time being they are dead. This drastic treatment has been reserved for rare cases, and apparently has been applied only where there was no proper subject-matter for patent rights and the withdrawal of the protection of the law of patents was demanded by national interests. Both of the avoided patents were concerned with the well-known " Thermit " process of welding, the utility of which in the present war, for military and naval purposes, it can well be imagined, is almost unlimited. Trough the agency of the Patent Tribunal and the Board of Trade, manufacture of a number of important and essential commodities has been started in great Britain. Many of them, doubtless, will prove to be established industries. Some of the most important cases at the outset dealt with German chemical processes, and competition for the rights of these patents was keen between both British and French firms. The strong hold which the Germans had obtained on certain branches of the chemical industry was demonstrated over and over again in the proceedings before the tribunal which sat at the Patent Office. One of the huge German agglomerations of chemical manufacturing interests is known as the Badische Anilin und Soda Fabrik, who had in association with them an English selling company well known all over the North of England. This company, at its works in Cheshire, continued the manufacture of as many of the Badische commodities as it could manage, under the supervision of a receiver appointed by the English Courts. But there were many applications from English firms for licences to carry on one or other branches of their trade, the ramifications of which were apparent throughout the dyeing, tanning, enamel and associated industries. Some very valuable mechanical and engineering patents have been before the Tribunal, while the formidable nature of German interests in the glass bottle trade and the machine embroidery industry was exemplified by the facts put before the Courts in connection with applications to make use of enemy patents. Evidence given by some of the most prominent Nottingham traders with reference to the machine embroidery industry left it quite clear that the Germans held almost exclusive command of the market; in fact, it had paid British firms to make the material which served as a foundation for the embroidery, send it to Germany for embroidering process and re-ship it to England, rather than enter into direct competition with the Germans and complete the process in England. Some of the best-known German chemical preparations, possessing titles so familiar in every household that the terms had become universally adopted as the accepted name of the article, could easily have been produced by British chemists had there been the slightest hope of a market. It was explained that the British public had grown accustomed to the preparation with the fancy title, which was registered as a trade mark, and refused to purchase the same preparation under any other name. The policy of the tribunal and the Board of Trade has been not to confiscate or transfer trade mark rights, but to suspend or avoid the operation of those which could be held bad in law, and where the registration would be likely to be cancelled as a result of this policy. Certain British manufacturers are now in a position to place the British industry on a sound basis before being called upon to meet German competition at the close of the war. Many people in this country have chafed at the apparent solicitude shown by the British Government for the German inventor and the capitalists who exploit him. There is a tendency perhaps on the part of those who use this argument to forget that there are in Germany substantial British interests which are situated in regard to their patents similarly to the Germans here, and are depending upon the protection afforded by the hostile Governments to their patents. The number of British inventions patented in Germany is not perhaps so large as the number of German patents in Great Britain, but, on the other hand, the latter possesses more trade marks protected in Germany than the Germans do in the United Kingdom. In the meantime the Public Trustee is collecting the royalties which in peace time would be payable under the licenses to the owners of the patents. The ultimate destination of the accumulated royalties is not decided. On the point as to whether they should be paid over to Germany, the readiness of the German owners to concede favourable terms to the English licensees will, doubtless, have a considerable bearing. The sum so far collected by the Public Trustee in royalties is not large—approximately £1,000. Big results were not, of course, looked for at this early stage.

" Formosa " Reports Progress.

The directors of the Formosa Gold Mining and Prospecting Company, Ltd. (Mount Anderson), in their interim report for the period ended 13th November, 1915, state: " In their report for the year ended 30th June, your directors reported the disclosure of good values in the leaders discovered on your property. You were then told the gold being slightly coated would not readily amalgamate, this difficulty has now disappeared and good results have been obtained during the months of September and October. Work is being continued on these leaders which, although narrow, show good values, and there is every indication of the leaders persisting, but it is impossible to say at present if the high values obtained so far will be maintained, future developments alone can tell. A new leader has been discovered showing a width of 13 ins. on the surface and carrying visible gold, but no development has been done on it up to the present. The following are the results of gold won during September and October: September: Tons milled, 10·95; gold won, 147·62 ozs.; value, £573 1s. 1d. October: Tons milled, 9·6; gold won, 197·3 ozs.; value, £774 19s. 8d. Included in the gold won during October are the proceeds of specimens recovered while developing during the month of September. The developments up to date justify the substitution of a 5-stamp mill in place of the present small prospecting mill, provided one can be obtained at a moderate price, the policy being to treat the ore from the leaders and also from the flat reef which exists in large quantities, is easily mined, but is of very low grade."

MINE VENTILATION: AN AMERICAN EXAMPLE.

At the Copper Queen mine, Bisbee, Arizona, the Spray, Gardner, Lowell, and Sacramento divisions are ventilated entirely by mechanical means. After the pressure and exhaust systems of ventilation were carefully studied, according to Charles A. Mitke, in a paper to the A.I.M.E.,* the former method was adopted. In this system, all mine fans were placed underground on the deepest working levels of the different divisions so as to draw the air down the intake shafts, force it through the workings and stopes, and exhaust it to the surface through upcast shafts. The reasons for adopting the pressure instead of the exhaust system are as follows:—(1) More practical. Since all the deep shafts of the Copper Queen are in operation and a large amount of work is done around each, as for example, men going on and coming off shift, handling timber, tools, and supplies, etc., it would not be practical to have an exhaust fan on the surface near the collar of the shaft. In the Gardner, a subway below the collar of the shaft would be out of the question. Consequently, a large air-tight chamber, inclosing nearly the entire head-frame, would have to be built if a suction fan were used. (2) Better control of mine fires. The pressure system is the more advantageous in case of mine fires. With this arrangement, the entire workings are under pressure, and the gas or smoke from a mine fire may be coursed to exit through neighbouring shafts that are not in operation. Since the air is under considerable pressure at the bottom and sides of the present fire districts and each of the outlets over them is provided with regulator doors, the quantity of air passing through the fire zone can be increased or diminished at will, and consequently the fire can be brought under control more readily than with the exhaust system. (3) Greater efficiency. Since the Spray, Gardner, Dallas, and Sacramento shafts are natural down-casts, the mine fans were placed underground so as to take advantage of these circumstances and multiply the volume of the natural down-cast from five to ten times. The pressure system, therefore, has the advantage of the additional natural ventilation, which evidently would be lost with the other system; and more power would be required for the same quantity of air if the natural down-casts were changed to up-casts by suction fans. (4) Greater safety. Experience in the Lowell mine fire showed that in the event of the connections being closed between the fire and the suction fan, there is a possibility of smoke and gases entering the workings below and endangering the men. In the adopted system, the maximum air pressure is below the fire district, which makes it impossible for gases to do down, even if bulkheads of a sealed fire district should be opened suddenly by caving ground. At present a churn-drill hole is being put down to a depth of 1,100 ft. over the old Lowell fire stopes. When this is completed water will be run in to cool the area. No trouble is anticipated, since this was thoroughly tried at the Holbrook, where a large amount of water was turned into churn-drill holes, and no smoke or gases were taken down against the pressure of the mine fan.

Advantages of New Ventilating System.

(1) A smaller quantity of compressed air is used for ventilation. (2) All possible natural ventilation is utilized, and the general direction of air currents is the same for both natural and mechanical ventilation. (3) There is a decrease in temperature, and a lower percentage of humidity and CO_2 throughout the mine, which means healthier working conditions. (4) A saving of eight 5-h.p. blowers was made, as these have been removed from the mine. (5) The five lower divisions are under pressure, which partly acts as a check in preventing some mine fires from crossing the Copper Queen side-lines, as for example, the proximity of one mine fire near the Gardner workings. (6) Less decay of mine timbers. (7) The volume of air has been increased from 60 to about 300 cu. ft. of air per man per minute. (8) Formerly a large amount of moisture kept the timbers and working places in a damp conditions, and fungus also covered most of the timbers. Since the mine fans were started, a large amount of water is removed daily from each division by the air currents, so that the mine is comparatively dry and the growth has disappeared. (9) The increase in velocity and volume of air resulted in the greater efficiency of the men. And (10) the new ventilating system is advantageous to the mines adjacent to the Copper Queen; there is a great deal of broken and stoped ground along side-lines, permitting a large amount of air to escape through these avenues and ventilated stopes beyond the Copper Queen boundary.

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*"Ventilation of the Copper Queen Mines," by Charles A. Mitke. Bulletin No. 105, American Institute of Mining Engineers, September, 1915.

Delagoa Bay Development Co.

REDUCED REVENUE—WAR AND EXCHANGE PROVE ADVERSE FACTORS.

The thirteenth ordinary general meeting of the Delagoa Bay Development Corporation, Ltd., was held in London during mail week, Mr. Frank Gotto presiding. Mr. F. R. Cunningham, the representative of the secretaries (Henderson's Transvaal Estates, Ltd.), having read the notice convening the meeting and the report of the auditors, the Chairman said: In the first place, I must apologise for my presence in the chair to-day in the place of our chairman, who, I am sorry to say, has just undergone a serious operation. I know I shall be carrying out the wishes of the shareholders in conveying to Mr. Heyland our regret at his absence to-day and in expressing the hope that he will have a speedy and satisfactory recovery. (Hear, hear.) I do not propose on this occasion to go into any comparison of the results of the corporation's business for the year ended June 30 last with those for the previous year, in view of the abnormal state of affairs through which we are passing on account of the war. You will doubtless remember that at the last meeting the chairman informed you that we anticipated a considerable falling-off in revenue, and we regret that these anticipations have to some extent been fulfilled. The revenue of the corporation has fallen off in every department more or less, and we do not look for any marked improvement on the current returns until after the expiration of the war. The fall in exchange to which we refer in the report is a matter for much regret, but it is one in which we are quite helpless, and when I point out to you that our returns to June 30 last were, owing to this cause, adversely affected to a very considerable extent, you will recognise what an important bearing it has on the affairs of the corporation. The capital expenditure during the year amounted to £4,919. Of this amount £2,535 was expended on the water supply, £1,884 on the electric tramways undertaking, and £231 on the Capitania Building. During the current year a considerable sum of money will be required to provide additional reservoir capacity in the town of Lourenco Marques, and, although your directors are unwilling to undertake this expenditure in the present state of affairs, they feel that it would not be prudent, in the interests of the corporation, to delay the work. The installation of additional electric power plant is absolutely necessary, as the demand for power still shows signs of increasing, and the expenditure is unavoidable if the present and future requirements in this direction are to be met with safety. Expenditure of this description must be made in a concern carrying on a business such as ours; but you can rest assured that we shall not spend more than we can help. In the meantime, every effort is being made to carry on the business of the corporation as economically as possible, and we can only hope that the time is not far distant when more prosperous times will return, and we shall again be in a position to recommend the payment of a dividend.

MOVING ORE IN FLAT STOPES.

[By E. M. Weston.]*

The following is a description of a method devised on the Rand for moving ore in flat stopes. Shallow wheelbarrows with grooved wheels running on a monorail prove efficient. Sharp curves and grades changing quickly from flat to 25° are no obstacle, but slightly smaller barrows are used. Is better method for Rand conditions than shaking chutes, is far cheaper than shovelling, and suits habits of native labourers admirably.

A serious problem has always existed in working small ore or coal deposits having a dip of from 5 to 20°, where the deposit is irregular, or where the timbering necessary is such that rails cannot be laid into the face; also where shaking conveyors are either too expensive to install or the dip too flat to render them effective. The problem has been to avoid the amount of hand shovelling necessary to bring the ore either to the nearest tram line or to some central installation of "shakers" or other conveyors. Recent articles in the *Journal* dealing with such cases have described the use of small trucks running on rollers, as in the North Star mine, California, or an arrangement of a fixed iron chute to facilitate shovelling. The question in some parts of the Witwatersrand is a most important one. Shovelling a "lashing," as it is called, is generally most inefficiently done. The native, unless well-taught, prefers to use his shovel like a hoe and to scrape the ore along instead of lifting and throwing it. There is often far too much of lashing down 100 or 200 feet of stope on the Rand. I was given charge of reclamation work in an area of a mine consisting principally of stopes of the grades mentioned, where comparatively small quantities of rich ore in pillars and overlooked foot and hanging wall sections were spread over considerable distances from tram lines and where the stopes were often narrow. Ore had sometimes to be brought through places not more than 30 inches high. I was compelled to consider some method of avoiding the excessive amount of shovelling that would have rendered much of the ore too costly to remove. I finally decided that the solution of the problem lay in adapting the old Cornish barrow to new conditions. The plan was to use a combination of a monorail truck, a Cornish barrow and a sled. When the barrow had to be taken round curves and when there were changes of grade from flat to 25°, I found that a barrow having a capacity of 2 cubic feet was the most economical size to use. Where there was a regular slope not exceeding 18° and where straight lines of rail could be used, a 3 cubic ft. steel-plate barrow, could be easily handled. However, the right capacity may easily be found by experiment. The construction and method of use of these barrows are easily seen. The wooden barrow is made of 1 in. or 1¼ in. boards, bound together with strap iron along the back of the bottom. There is at the back a removable wearing piece of harder wood about 4 x 2½ in., with a slight groove cut in the centre for the top of the rail to slide in. This is gradually cut through by the friction and is renewed underground as required. The barrow as a whole suffers little wear from rock shovelled into it, and I had not renewed a single bottom during the course of a year in consequence of this wear. The wheel is made from a circular piece of hardwood board about ½ in. thicker than the rail upon which it has to run. On each side of it is bolted a circular disc of ⅛ in. steel-plate, having a diameter about ¾ in. longer than that of the wooden disc. These forms flanges that keep the wheel upon the rail. The discs are cut out to receive a wooden hub 4 in. square, turned down on each side to a 2 in. pin. In the latest design, this pin or axle works in blind bearings cut in blocks of wood, screwed or bolted to the inner sides of the side pieces of the barrow, so that the wheel can be easily changed by unscrewing. The flanges are strong enough so that the barrow can be wheeled along a plank or along the bottom rock of a stope when necessary.

In taking a load of ore down a narrow stope, the barrow is pushed forward and slides along on the wheel and on the back wearing piece, while the operator holds the handles and thus prevents a capsize. In a difficult or flat place, the method of progression is by a succession of pushes, but in easy places it is really a gentle advance on the slide with the operator, half crouching, following it. It suits the habits of the natives admirably, and they soon take to the use of it when shown. It is of course dragged up the stope along the same line whei empty. In rounding curves, the native soon learns to swing the rear of the barrow so that the wheel does not jam. The great advantage of this system is the simplicity and speed of track laying. The track consists of a single length of old or new rail, which can quickly be bent to avoid timbers or packs in a stope. The rail is supported upright in the simplest manner with old pieces of timber larger than 6 in., secured by nails or spikes, or by old iron sleepers cut in half and attached so that they project on opposite sides of the rail. With a few pieces of timber, some nails and perhaps some coupling plates and bolts, any unskilled man can lay a line without trouble in a few minutes and take it up again if necessary to preserve it from the blast at the end of the shift. This is not the only advantage—a main line, single or double, can be laid into a face, and from it branch lines can be laid off to various parts of the stope. The junctions of the rails are simply the ends or sides laid together; the operator of the barrow simply lifts its front wheel from one rail to the other and continues on his way. Several barrows can run on the same line in opposite directions, as the empty barrow is simply tipped off the rail when meeting occurs and put on again in a short time. The saving in capital expenditure is obvious. The barrows cost only 30s. or less and last a long time. They are easily moved away from the area of blasting, and any repairs can be cheaply made. The various items of the equipment are found in any mine and may be used over again many times. The next question to be answered is—what is the efficiency over other forms of conveyors and over shovelling? I have already stated that such a method makes no claims of superiority to regular stope tracks or regular conveyors in handling large tonnages. It may be useful in feeding them. Its place is apparent when the regular methods are not suitable. For moving broken rock it is more efficient than shovelling, if the distance the rock has to be moved is more than about 30 ft., but in the case of the barrow there must be a place where the rock can be tipped with ease or it must be removed as soon as tipped. This means that the rock cannot be efficiently piled up in a heap with a barrow. In the flatter stopes, one native without close supervision loaded and moved three tons (30 barrows) every shift over a distance of 300 ft. Another moved five tons in a higher stope. With larger barrows two natives loaded and moved enough rock down 100 ft. of line in a 15° stope to keep two other natives employed shovelling it into a 14 cubic ft. truck, tramming it 200 ft. and tipping it. These two natives with barrows did the work of six or eight natives by the old shovelling method. The native must be taught how to use the barrow, but he soon takes to it as the change of work appeals to him. It is easier with this method than with shovelling to get definite results from a given gang of natives under a boss boy, as each native has a definite task to do and need wait on no one. A tally of the barrows moved can be kept and a contract system arranged. Several engineers who saw the system at work endeavoured to introduce it in other mines, but it is quite impossible to introduce any new system on the Rand, however good it be, without first starting on a small scale and gradually training men and natives in its use. Otherwise, it is at once voted a nuisance and the first opportunity is taken of leaving the apparatus in the stope to be blasted. This is a true picture of Rand conditions as many can testify from bitter experience.

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* From the *Engineering and Mining Journal of New York.*

THE CHEMICAL TRADE AND THE WAR.

Light on the Position of Glycerine, Sulphuric and Nitric Acids, Soda Ash, Caustic Soda and Other Products used in the Mining Industry.*

Since the war began there has been an unprecedented demand for what are known as heavy chemicals, though it must not be supposed that the demand is general. In the alkali trade, for instance, in the case of those chemicals which are wanted for the manufacture of explosives, that is, sulphuric and nitric acids, the plant available was soon found insufficient and has been largely added to. Bleaching powder, though required for other than explosive purposes, has had its available plant severely taxed. Soda ash, on the other hand, which is produced in large quantities, has experienced no abnormal demand. One of our weak points in comparison with Germany was that so much of our production of sulphuric acid was made in works without concentration plant, the weak acid being utilised straight away for the manufacture of sulphates such as alum, sulphate of alumina for water and sewage purification, etc. The strong acid which is necessary for the manufacture of explosives, coal tar dyes, etc., is produced either by concentration of weak vitriol in special apparatus or by the employment of the contact process of manufacture, as against the old chamber process. It is understood that at the outbreak of war there was only one contact plant in Britain making strong acid for sale, the very few other plants that existed making it solely for the consumption of the works to which they were attached. Of course, the output of these latter soon became available, but there was a decided shortage until extensions to existing plant and the bringing into commission of others which were in course of erection had been brought about.

This is a topic which we do not feel at liberty to discuss in detail, but it may be stated that the former shortage of high strength vitriol for explosive purposes has now been remedied, and that those who are looking after the matter have the situation well in hand. This is, of course, as far as the war is concerned. For general manufactures the ruling high price of vitriol indicates the lack of available supply. With regard to the future it is noteworthy that two opposing views are held. While some manufacturers, at any rate—we no not pretend to say all—hold the view that after the war there will be a deluge of vitriol which it will not be possible to place on the market, this pessimistic view is combated by chemical engineers, who are busily engaged in designing and erecting new plant. Some of the developments in progress entail the utilisation of the sulphur in the Australian zinc concentrates about which we have heard so much. Of course, the idea is by no means new in Britain, as it has long been customary for the Welsh output of blende to be sent to Muspratt's works of the United Alkali Company at Flint, to be roasted in the vitriol furnace before going on to Swansea to be smelted. It is understood, however, that blende is now to be used as the source of sulphur for a contact sulphuric acid plant, and this is certainly a novelty in this country. One can understand that a decided attraction which blende offers over Spanish pyrites is the absence of arsenic, an element which is a great bugbear in the contact process, as it " sickens " the platinum catalyst.

With regard to the supply of pyrites, the raw material for the vitriol manufacture, difficulties encountered a year ago have been largely surmounted, though high prices due to freight still rule. As the German market with individual works, such as the Badische Aniline und Soda Fabrik, and Kuhlmann's consuming as much as 100,000 tons each per annum, is closed to Spain and open to Norway, the latter country has increased her exports to Germany, while Spain has sent more to Great Britain.

With respect to the tar-distilling industry, it is common knowledge that the output of toluol for the manufacture of T.N.T. is controlled by the High Explosives Committee of the War Office. Despite the very large demand, the supply comes up to it, as very complete arrangements have been made for utilising all available sources. Moreover, the normal output of the tar distillation works derived from gas tar has been augmeted by the product of the distillation plants erected at colliery recovery coke-oven plants, where crude benzols are now being fractionated. Professor Bone, in his presidential address to the Chemistry Section of the British Association at Manchester, gave some tabulated figures showing the yield of toluol from coal tars of different origin, and they may be summarised for the information of the general reader by the statement that we are now obtaining a yield of one gallon of toluol per ton of coal carbonised in gas retorts. As coke oven carbonisation does not yield so high an amount, it may be presumed that the enemy is not doing as well in this respect as we are.

Aniline oil has recently risen considerably in price—up to 2s. 6d. per lb. having been asked for it—and its export has been entirely stopped. Although it is in great demand for the aniline dye manufacture and for making synthetic indigo by the phenylhydrazine process, the rise in price is not due to an abnormal demand, but to the fact that the output has been compulsorily reduced owing to the commandeering of benzol by the authorities for the explosives manufacture. The use of benzol for motor cars is now, we may add parenthetically, entirely forbidden.

An important chemical, the phenomenal rise in price of which is causing concern to many different industries, is caustic soda. Existing plant, and also, we may add, labour, is totally inadequate to deal with the orders received at the alkali works, and again America has come in. American caustic is not exactly a novelty in England, as it has not been unusual in the past for the excess American production to be dumped at Liverpool. Not, however, at prices such as have ruled lately. A very recent quotation for 74/76 per cent. caustic c.i.f. Liverpool was £27 10s. per ton, and though we do not know whether business was done at this figure, we do know that it has been done at £22, which is, roughly speaking, double the price ruling a year ago. Doubtless the feverish production of coal-tar dyes has something to do with the increased demand, though in the case of this, as of many other chemicals, it must be remembered that we are doing as much as we can to assist our allies with products whose manufacture entails the use of caustic soda as well as other chemicals which have risen greatly in price.

It might be asked, seeing that soda ash remains at such a very reasonable price, why do not people who use caustic buy ash and causticise it? The times, however, are not opportune for putting down new plant or extending existing plant, both because of the difficulty in getting delivery and also because of the scarcity of skilled labour for work which is not directly concerned with munitions. This scarcity of labour is, of course, general in the chemical trade, and, moreover, a good deal of labour which has been obtained as auxiliary is both inefficient and expensive. Again, incidental expenses have risen all round; casks and bottles are dearer, laboratory chemicals and apparatus are up, when they can be obtained at all, and a great deal of overtime has been put in by chemical manufacturers, who, the public take it, have had the time of their lives during the last twelve months.

On this we may remark that whilst compared with the cotton industries, the bulk of the chemical industries have, of course, done well in spite of various troubles and anxieties, when the excess profits tax comes to be paid, we imagine that its yield will be by no means so startling as in the case of other industries which we shall forbear from particularising. Concerning the direct and active part the chemical manufacturer is taking under the control of the War Office, we preserve a discreet silence.

Glancing at the oil and soap industries, we may refer to a matter which attracted considerable attention a year ago. This is the large business done in Germany, notably at Hamburg, in crushing palm kernels for oil. The business

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*From *The Engineer*.

developed in Germany mainly owing to the excellent Woermann Line service from West African ports. The war, of course, put an end to supplies, and the shipments were speedily directed to England, where the established seed-crushing firms at Liverpool and Hull soon got to work. We are probably not far wrong in saying that where one ton of palm nut kernels was crushed in England before the war, 100 tons are being crushed to-day. A further advantage beyond the oil production is that the palm kernel cake obtained as a by-product has been in large demand by agriculturists now that its value as food for stock has been established. As regards raw material generally, the soap-maker has had ample supplies. None of the ordinary sources of supply have failed him, and, moreover, he has the hydrogenated whale oil at his disposal if market prices tend to favour its use. Here he is, as regards the better qualities, in competition with the margarine maker, who, in these days of increased taxation and abormal prices for butter, is finding his business largely on the increase and with a class of customers who have previously given him the cold shoulder.

We are not going into details here regarding the margarine industry, but we may be allowed to express our admiration that the chemical research of so many years has succeeded to the extent of enabling the foul-smelling whale oil to be converted into solid fat, which in its best qualities makes a very good butter substitute, and in its inferior grades can be readily utilised for the manufacture of soap and glycerine. The process of hardening or hydrogenating whale oil is now being carried out by four British firms, though Norway may be looked upon as the particular home of the manufacture. In a few words, the chemical action consists in converting an unsaturated oil into a saturated one by the addition of an atom of hydrogen, the process being effected by the use of a nickel catalyst. The resulting solid fat acts much the same as tallow in soapmaking, the glycerine yield being similar. The production is now established in Germany, and German capital is also concerned with some of the new Norwegian works. Soon after the outbreak of war shipments which were destined for England to fill contracts were diverted to Germany on account of the high price offered, but at the present time the material is being delivered again in England as usual. At the market price, let us say, of £34 per ton hardened whale oil does not always attract the soap-maker, who has to buy it in the open market, but no doubt certain soap firms in England who produce it can do so at a figure which makes it much more profitable for them to use it in place of tallow. A question which will probably become more acute as time rolls on is whether the supply of small Antarctic whales will stand the present large destruction of their numbers.

Glycerine, an important by-product of the soap industry, is, of course, in large demand for explosives, and for some time it has been in the absolute contraband list. Quite recently the Government has taken the whole output of crude glycerine at a very fair price, only what is known as edible or pharmaceutical glycerine being at the makers' disposal for general sale. This product, which commands double the price of crude glycerine, is made in comparatively small quantities. Owing to Germany's great shortage in imported fats, she must doubtless be short of glycerine, and no fatty matters which can yield glycerine may be exported from this country to Holland without a special permit. Soap, of course, does not matter as long as it is genuine and not the make-believe containing glycerides, which, according to certain paragraphs in the papers, it has been sought to smuggle into Germany.

In the very varied domain of fine chemicals for pharmaceutical, photographic and other uses a considerable increase in the British output has been effected, though with regard to the erection of new works in a branch of manufacture in which Germany is well established it must be confessed that we are proceeding with caution. It is recognised that German goods will sooner or later be again available to test the patriotism of the British buyer. Further, we are not the only country which is increasing its chemical manufactures. America, Russia, and Italy are putting up aniline dye works among other chemical developments, and if it were not for the freight it is certain that more chemicals than is now the case would be coming to us from across the Atlantic. This is shown by a perusal of certain American trade journals, in which for the first time appear inquiries from Great Britain for quotations for regular deliveries of certain chemicals. In the majority of cases present freights are prohibitive, but this condition of affairs will not, of course, be permanent. As an instance of the rise in freight, we may refer again to caustic soda, which from 12s. 6d. per ton has risen to £3, an impost which, we have seen, has not deterred the export of this particular article at the moment. With regard to bodies of much greater bulk per ton, the rise has been correspondingly greater on account of shortage of available space on board. There is no doubt, however, that in the absence of tariffs, a matter we do not intend to discuss, the British chemical manufacturer sees more competition in the future than he has had in the past, and is therefore carefully weighing matters before unduly expanding his premises, with which remark we bring this general and necessarily incomplete review to a close.

Legal Decisions Affecting Mining.

LANGLAAGTE PROPRIETARY AGAIN.

The case of the Liquidator of the Langlaagte Proprietary Co., Ltd., v. The Union Government, Railways and Harbours, was held in the Rand High Court last week. Counsel engaged were: Mr. Stratford, K.C., Mr. Stallard, K.C., and Mr. Barry for the plaintiff; Mr. R. F. MacWilliam, and with him Mr. Nixon, for the defendants. The plaintiff claimed: "Declaration of the amount of compensation due to plaintiff by defendants in respect of the expropriation for railway purposes of a certain portion of the township of Paarlshoop, and of certain servitude over certain gold mining claims on the proclaimed portion of the farm Langlaagte No. 129. Also payment of the amount found due, with interest and costs. As an alternative to the determination and payment of the amount due in respect of the expropriation of the servitude, plaintiff claimed an order to eject the defendants from occupying the ground on the surface of the claims for the purpose of using and maintaining a railway line thereon, and to restrain them from maintaining the line, or alternatively £77,000 as damages." According to the plaintiff's declaration, he was owner of the township of Paarlshoop and specific gold mining claims thereon. In 1903 the Transvaal Government expropriated certain claims in Paarlshoop, and in 1904 the railway obtained a servitude to maintain a railway on the property. This, it was contended, had prevented the company from mining beneath the railway line. The value of the land expropriated was £7,520, and the loss to plaintiff by reason of deprivation of mining rights was £77,000. The right of the company did not exist to acquire the servitude, as it obstructed the working of an open mine. Defendants excepted to this plea on the ground that the mine was not an open one within the meaning of the Act; and that the plaintiff's cause of action against defendants arose more than twelve months before the issue of summons, and any right of act was now barred. The declaration, too, was vague, embarrassing, and bad in law, and disclosed no cause of action. Mr. MacWilliam, for the defendants, argued for the exceptions, and Mr. C. F. Stallard, K.C., replied against them. His Lordship, however, rejected the plea of prescription and the plea that the declaration was embarrassing and bad in law and disclosed no cause of action. The exceptions were dismissed, with costs. Leave to appeal was granted.

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Far East Rand.

A PLEA FOR A BEGINNING.

To the Editor, *South African Mining Journal.*

Sir,—As a good deal of interest is being manifested in several of the unexplored properties situated in the Far East I would like to point out, in my capacity as an old prospector of 20 years' standing in the district, the outstanding features of such areas as the "Rand Klip," "Cloverfield" and Lydenburg Farms Companies. On the two former areas, I feel justified in stating that the Modder-Van Ryn series will be found equally as rich, when sufficient development has been accomplished. On the Lydenburg Farms Company's property—Vlakfontein—which runs contiguous to the Daggafontein Company's ground—not alone has it got a chance of striking the deep level of Daggafontein (especially if the latter reefs flatten), but outcrops are known to exist on the farm referred to, and I venture to hazard the opinion that with a little judicious prospecting, some important discoveries might be made, helping to establish more than ever the phenomenal possibilities of the district and the Lydenburg Farm Company's holding in particular. I write with the object of calling attention to the sponsors of those company's referred to, in the hope that no time will be lost in recommencing development, and instituting research work. It might be argued that in these times capital cannot be raised, and this I admit up to a certain extent; but when only an infinitesimal sum is required for tentative prospecting, entailing as it would, the clearance of shafts, etc., for the purpose of carrying on a certain amount of driving and sinking, until the European situation improves, then I maintain an effort should be made by the controllers to propound a scheme of working on a limited scale. It is the unproved mines to which I refer that we look for the expansion of the industry, and only by their resuscitation (especially possessing, as they do, such vast possibilities) can we look for a era of activity and prosperity. I hope my remarks will not fall on deaf ears, more especially as there are hundreds of shareholders with scrip in these concerns at very high prices, and who look to the controllers in question to "play the game."—I am, etc.,

E. L. E.

Benoni, Nov. 30, 1915.

Canadian State Enterprise.

To the Editor, *South African Mining Journal.*

Sir,—The Government of British Columbia is making every effort to secure wider markets for the forest products of the Province. In connection with this movement pamphlets are now being issued, copies of which are enclosed. These are intended for distribution to lumber buyers and consumers throughout the world, and are entitled as under: (1) British Columbia Timber; (2) British Columbia Red Cedar Shingles; (3) How to Finish British Columbia Wood. Copies of these pamphlets may be obtained free upon application to the Agent-General for British Columbia, Salisbury House, London, E.C., the Canadian Trade Commissioners throughout the world, and the Forest Branch Victoria, B.C. May I ask for mention of these publications in your journal, for the information of your readers, and the strengthening of the trade relations between this province and the territory in which your organ circulates, reference being made to the readiness of this department to answer all enquiries on the subject.—I am, etc.,

M. A. GRAINGER,
Acting Chief Forester, British Columbia.

Transvaal Tobacco for Our Troops.

To the Editor, *South African Mining Journal.*

Sir,—Will you kindly assist a good cause by inserting enclosed circular in your news columns, as this is a *South African Fund* for *South Africans.* I confidently appeal to your readers for subscriptions, which can either be sent to you, to be forwarded, or direct to me—no sum too small, no sum too large—to enable us to keep up the supply. Thanking you in anticipation,—I am, etc.,

P. H. POTTER, Hon. Secretary.

Overseas Club, East London Branch,
November, 1915.

The circular is as follows:—

S.A. CONTINGENT TOBACCO FUND.

The East London Branch, Overseas Club, has inaugurated, a fund to supply Our Boys of the South African contingents with Transvaal tobacco, and we have arranged with the manufacturers to provide it. We therefore appeal to you to assist us in this matter. "Union is strength," and much can be done by means of entertainments to swell the funds; the large towns can help by means of subscription lists. For every shilling subscribed we shall send half-pound Transvaal tobacco and 25 cigarettes. This Branch has made all preliminary arrangements, and we now appeal for help to enable us to keep up the supply. The lists will be published (as they arrive) in the "Daily Dispatch."

[To save time we would suggest that subscriptions be forwarded direct to East London.—Ed. *S.A.M.J.*]

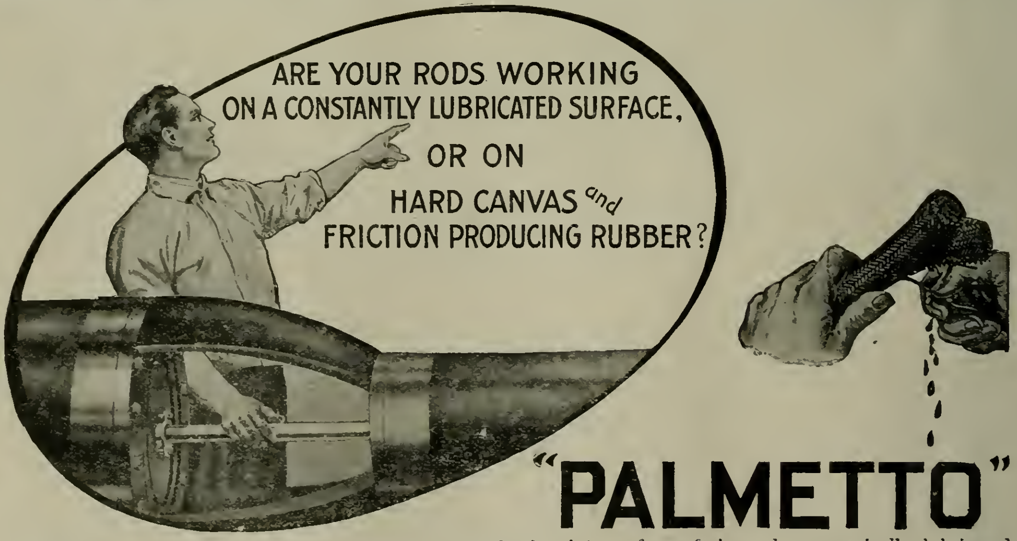
Coal Prospects on the Karroo.

To the Editor, *South African Mining Journal.*

Sir,—Your article upon the "Coal Prospects on the Karroo," with the accompanying report by Mr. A. L. Chambers upon the occurrence of coal on the farm De Drift, Cape Province, revives interest in what is really a very old problem. The existence of coal in profitable quantities has never yet been found either in the Dwyka or Ecca series of the Karroo system, as far as I am aware, whether in the Cape Colony, Natal, or the Transvaal, although a considerable sum of money has been spent at one time or another in searching for it. Small seams have been found occasionally, even in the vicinity of the Orange River, I believe; but nothing worth looking at as an economic proposition. Neither has anything of importance ever been found in the Beaufort series of the same system in the Cape Province, with the exception of the occurrences described by Mr. Chambers as being probably at the extreme base of the Beds referred to, and some alleged coal in fissures, of similar kind apparently, in the sandstones of Leeuw River Poort, not far from Beaufort West. The latter deposits were worked by a Kimberley syndicate before the last Boer War, and, although everything possible was done to make the undertaking pay, and to find the original undisturbed source of the material, the venture was unsuccessful. If working conditions had been at all favourable the concern should have paid handsomely, because the market for such a product was quite a good one, and the quality of the stuff itself was reported to be excellent for many purposes. When one comes to mining coal, as it was considered to be, in fissures with no regularity in the matter of width, and with every variation in point of strike and dip, the proposition is obviously much more difficult and uncertain than ordinary reef mining. I speak of the Leeuw River occurrence as alleged coal because, as far as I have been able to ascertain from those who have been able to study the deposit thoroughly, it has not the characteristics of a true coal, either physically or chemically, and with regard to its geological occurrence it is so unusual that, as Mr. Chambers remarks with respect to the De Drift occurrence, "it is necessary to put forward a theory to account for it." The latter deposit is evidently one of the same kind as that at Leeuw River, and for the same reasons must, I venture to say, be described as "alleged coal," or, in other words, as something which is, in my opinion, not coal at all. I drew Mr. Cunningham Craig's attention to the matter when he was out here on behalf of the Union Government in 1913, as a geological curiosity, which might possibly have some bearing upon the investigation he was engaged upon. He was unfortunately unable to make a visit to the neighbourhood, and had not apparently been informed of it by the Geological Survey Department of the Cape Province. As the result of enquiries which he eventually made, however, he found himself in accord with a theory I had myself proposed some years ago, to the effect that the carbonaceous material of the seams was due to the distillation of bituminous material. I think you will be able to find this suggestion of mine in some of your back files. Mr. Craig says, in his report to the Union Government: "At Leeuw River Poort light bituminous coal in vertical seams is recorded. I did not visit this locality, but from the evidence and the fact that the coal contains only 0·8 per cent. of ash, there can be little doubt that these vertical seams of so-called coal are manjak or grahamite veins, which have been introduced in a liquid or semi-liquid state. Such occurrences frequently occur above oil-bearing rocks, *e.g.*, in Trinidad and Barbados; but in this case the action of igneous intrusions has probably been the determining cause of the distillation of bituminous material. The area is close to the margin of the province characterised by the presence of post-Karroo dolerite intrusions." The occurrence is, in fact, a more largely developed phase of the same kind of phenomena as those which have given rise to the oily compounds which are so abundantly associated with the dolerite intrusions of the Karroo system, from Carnarvon to Basutoland. It will be observed that the percentages of ash in the samples referred to by Mr. Chambers are much higher than in those to which Mr. Cunningham Craig alludes; but even so, it appears that the samples analysed in Capetown only showed 2·61 to 8·58 per cent. of ash. In any case, the percentage of ash, on the distillation theory, would be likely to vary considerably, because it might be assumed that a lot of extraneous material from the walls of the fissures would very likely be mixed with it. I am afraid Mr. Chambers' alternative theory of the forcing of coal into fissures, as it seems to have been forced in the case of Leeuw River Poort is quite untenable, and since the De Drift very evidently belongs to the same class of deposit, and has been formed in precisely the same way, the theory is *ex similibus* unsound. Not that the so-called coal of De Drift is, therefore, a product of no economical value. On the contrary, according to Mr. Chambers, it is distinctly a profitable commodity. The theory of its origin has mainly to do with the possibility of developing and mining it economically, and has, of course, a good deal of bearing upon the possibility of finding the source of the material.—I am, etc.,

J. E. MILLS DAVIES.

We have received the Pilgrims' Rest *Mines and Claimholders' Quarterly*, which has been published under the auspices of the local Mines and Claimholders' Association and the editorship of Mr. A. A. Menkin. It is an excellent production; the articles, all by local men of experience, are most interesting.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SUGGESTIONS FOR A NEW GOLD LAW.

Why and How the Pilgrims Rest Goldfield Would Benefit.

[C. Howard.]*

The economic stress due to the war will be long and severe. Peace will find us burdened with a heavy National Debt, involving proportionately heavy taxation for many years. In these circumstances, it is necessary to exploit to the utmost all our undeveloped resources, one of the most important of which is the gold of this district. It is not the purpose of this article to describe its extent and wealth, which are well-known to all the residents. It is beyond controversy that these goldfields are capable of supporting a large mining population, and that the auriferous deposits can be worked without much capital. The Pilgrim's Rest Goldfields have been rightly characterised as the paradise of the small man. Forty odd years ago, under President Burgers, the district was proclaimed a Public Goldfields, and alluvial digging was commenced and carried on successfully, until the Kruger Government granted sundry concessions, closing the fields to the public. There is evidence that the diggers, numbering at most a few hundreds, using the simplest appliances, won gold to the value of between one and two million pounds sterling, during the few years in which they were allowed a free hand. Lately, portions of some farms having been re-proclaimed under our very restrictive Gold Law, a few small quartz mines and a little alluvial digging have resulted. Under this law, the industry can make no progress: the landowner is, in practice, the sole arbiter of the destinies of gold mining on these fields. No one can prospect a farm without the owner's permission; if such permission is granted, and gold found, the owner is entitled to 20 per cent. of the portion to be proclaimed, as his mining reserve. The public who peg outside this reservation pay a yearly rental of £4 6s. 6d. per morgen for the right to look for gold, half of which rent goes to the landowner. When gold is found, various other heavy charges are levied. The landowner is thus the largest beneficiary, at the expense of the prospector and digger. His monopoly is far more complete than appears, since, from the contour of the country, it is usually possible to select the 20 per cent. of any farm in such a way as to leave the remainder almost useless, except as a deep-level proposition. The nett result of the operation of this (Anti-) Gold Law is that the gold output of the Transvaal, excluding the Rand and half a dozen large mines, is £200,000 a year, about as much as the alluvial diggers were getting in five or six miles of creeks, in the Dolomite hills round Pilgrim's Rest, some forty years ago. Even these few miles were not worked out, and at least one hundred miles of likely river bed remain untouched. To bring about a new and brilliant era in gold mining in the the Lydenburg district, it is only necessary to give the people permission to work; such permission could easily be granted without the violation of any principle of justice. A new Law could be framed on the following lines:—

Area to which the Law should apply.—A belt of country in the Eastern Transvaal, bounded as follows:—*South* by the latitude of the Duivel's Kantoor, Kaapsche Hoop; *North* by the latitude of the Oliphant's River, at a point north of Marieps Kop; *East* by a line keeping two miles to the east of the Eastern Escarpment of the Drakensbergen, thus including two miles of the Granite Country; *West* by a line 30 miles west of the Eastern line.

Incidence of Proposed Alterations.—The amendment to apply to all ground in the area not held under Mining Title, except Cultivated Lands, Homesteads, Townships, Cemeteries, and Native Locations.

Alterations in Law.—(a) Owners' Mining Rights to be commuted for a royalty of 2½ per cent. on the output; (b) Government to receive a royalty of 2½ per cent. on the output from Crown and Private Land; (c) Claim licence 10s. per annum; (d) Work to be a condition of tenure; (e) Alluvial Claims to be 600 feet by 400 feet; (f) Reef Claims to be 1,200 feet by 600 feet; (g) Monthly detailed output from all sources to be published.

Remarks:—

Mining Title.—This includes mineral concessions, mynpachten, and claims.

Owners' Mining Rights include right to peg mynpachten, and to receive half the licence money paid by the public on ground outside the mynpachten

Royalty.—By the substitution of Royalty for monthly licences, the industry will be taxed on results. Profit Tax to be merged into Royalty.

Work.—The amount of work required should be more than nominal, and not too onerous, with provision for remission. In case of amalgamation, should it be beneficial, work might be confined to one block.

Competence of Parliament to alter the Law.—Seven years ago, Parliament conferred large additional rights on landowners, without any consideration, and without giving the public any compensatory benefit. It appears to the lay mind that Parliament can again alter the Gold Ordinance without violation of the Grondwet.

Dimensions of Reef Claims.—A Reef Claim of the proposed size would contain 60,000 tons of ore if the reef were flat, and averaged 12 inches in width. This is probably sufficient for any five-stamp proposition.

Monthly Publication of Gold Output is the most trustworthy guide to the investing public, and the best advertisement the district can have. Besides, the gold belongs to the State, and the people have the right to know what is being produced.

Direct Effect on Revenue.—Since the law will apply to land not now held under Mining Title, any effect on the Revenue must be an increase. Under the present law, the area under consideration can never be exploited, and will never produce an appreciable revenue.

The rapid action of a Gold Law can be seen in the history of Rhodesian Mining. In 1904 the country was languishing. Although good propositions were known, investors and prospectors would do no business, in view of the 30 per cent. clause. Any capital subscribed up to that date had been obtained through the influence, and from the friends of the Chartered Company. When this source was exhausted progress was arrested. The company reduced their charge to 2½ per cent., and, without any imported capital, the country leapt into prosperity. In less than two years the outputs from the small concerns financed by the colonists was three-quarters of a million sterling per annum, equalling the output of the few larger companies financed by the present company. To-day the annual output is nearly three millions sterling. Many farmers object to gold mining on their farms; it is not difficult to show that their objections have no serious foundations. In nearly all cases, gold is found in rugged places, useless for farming purposes, except for a little poor grazing; and when a reef has been opened up and equipped with a ten-stamp mill, the whole of the works and buildings could usually be enclosed by a fence 150 yards square. The poisoning of streams is easily avoided, and any prospecting shafts outside the general enclosure can be fenced or filled in for a few shillings. Whilst the injury to the farm is negligible, the benefits to the farmer are large. His 2½ per cent. royalty, whether a large or small amount, would be a monthly cash payment; and in the case of a five-stamp proposition, with a staff of 4 white men and 50 natives, his sale of produce to the mine would be to the value of £3 0or 40 monthly, at rates higher than those he could obtain by sending his produce to market. His wagons would be in constant demand for transport, and his sons would be employed, learning also mining and gold extraction. Those on whose land gold were worked would enjoy larger markets and better prices. Of all classes, the farming class would benefit most rapidly and certainly, from the opening up of the goldfields. It is needless to point out the tering Gold Law. Technical men would be in demand, and unemployment of all kinds diminished. Trade would advantages that would be gained by all classes under a fos- flourish, Revenue would benefit directly and indirectly, and national burdens would be lightened.

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* From the *Pilgrims Rest Mines' and Claimholders' Quarterly.*

ECONOMIC CRISIS IN S.W. AFRICA.

The Money Circulation Difficulty—Diamond and Copper Mines to be Re-started.

THE Capetown Chamber of Commerce has received the following telegram from the Secretary of Finance, viz.:—"Your telegram and letter regarding banking facilities South-West Africa Protectorate, Imperial Government has been asked to consider request that Deutsche Afrika Bank £27,000, at credit with Diconto Geselschaft, London, may be released for remittance to Protectorate through Union banks. Request is under consideration Imperial Government. Understood that Deutsche Afrika Bank has obtained credit of more than £27,000 in New York, and bank can therefore make usual arrangements with Union Banks for transfers against such credit to Protectorate. Deutsche Afrika Bank and Land Bank have been given every facility endeavour obtain funds from Germany or neutral countries so as enable them place their clients in funds. German coins as well as Reichsbank notes are accepted by Government in payment of transactions with Union Government, and German coins also accepted by Union banks, who also make advances against Reichsbank notes handed them for collection or safe custody. Arrangements have also been made to enable working diamond and copper mines, and Union banks are providing facilities for this purpose. Arrangements also made for permitting export copper ore to United States. Government is alive to desirability of re-establishment trade with Protectorate, and consequently has given German banks every facility possible to enable them endeavour obtain funds to pay out their clients. Merchants in Union, if paid in Reichsbank notes or German coins, have same facilities as Government for realising such notes or coin through Union banks. Union banks in view recent information received are now in position advise merchants regarding realisability of Reichsbank notes."

The Kaufmannschaft, Windhuk, has also addressed a communication to the Chief Secretary of the Protectorate, dated the 28th September, in the following terms, viz.:—Sir,—We beg to hand you the conclusions arrived at by the assembled merchants of Windhuk on the 23rd of September, with its arguments:—

MONEY MATTERS.

The money in circulation in the Protectorate has always been limited, and can to-day be put down as follows: Bank-notes, £300,000; coin, £50,000; Protectorate notes, £150,000. The last-named are still in circulation of the £250,000 issued in the beginning of the war to meet the want of money, always felt in the first time of each war; of this amount about £100,000 are said to have been called in and destroyed. The circulation of money before the war was really as follows: The Government paid out for public works, railways, salaries, etc., and got money in from Customs, taxes, buying of surplus money in the banks, and from money (notes) occasionally sent from Germany. The import of the Protectorate was more than covered by its export, particularly by diamonds and copper ore, whereas the export of wool, hides, guano, cattle, meat, is insignificant for the present.

ECONOMICAL SITUATION.

The occupation of the Protectorate led to the following situations and consequences:—(1) Import and export had come to a standstill during the last twelve months. (2) The work on the diamond fields and the mines has nearly totally ceased. There is no chance of getting work, partly through want of materials and partly because no public works are being executed by the Union Government, nor are inhabitants of the Protectorate employed on these works. (4) Officials of the former Government, about a third of the white population, do not receive any, or very small, sums in payment of their salaries. (5) The debts of the former Government are not paid, neither the requisitions of the Union troops. It follows necessarily from all this that a standstill has entered into the economical lift of the inhabitants, which is in reality aggravated through the difficulties which have cropped up in connection with the circulation of money.

CIRCULATION OF MONEY.

In conformity with a Proclamation of the Union Government, its authorities, banks, and merchants take notes in exchange as follows: (a) Bank-notes at a discount of 25 per cent.; (b) Protectorate note not at all. This means that the money in circulation, about £500,000, is decreased by £225,000, or half. As since the beginning of the war the Protectorate was debarred from importing goods, and as it produces only small quantities of provisions, these had to be imported from South Africa, which has caused an outlay of at least £100,000 in notes and coin, while from the side of the Union Government very little money has been put in circulation. In consequence of the above-named measures, the money in circulation before peace was signed has been decreased by about £325,000, or two-thirds, and the money in circulation before the beginning of the war, that is without Protectorate notes, by about £175,000, or half.

A SERIOUS CRISIS.

With a view to the above the merchants of Windhuk want to impress upon you the fact that the Protectorate is undoubtedly labouring under a serious crisis, and that measures should be taken to bring about normal conditions as was signified by General Botha in his proclamation of the 9th July, 1915.

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"GOLD FIELDS" ANNUAL REVIEW OF RAND MINING.

Report by Manager and Superintending Engineer on Industrial Conditions and the Position of Subsidiaries—Effect of War on the Industry—Native Labour Prospects—The Campaign Against Miners' Phthisis.

In his annual report for the year ended July 31, 1915, the manager of the Consolidated Gold Fields at Johannesburg, Mr. D. Christopherson, writes:—Although war conditions have governed the whole period, the operations of the Witwatersrand Gold Mines have, nevertheless, during the twelve months ended 31st July, 1915, been continued without interruption or serious interference, which is mainly due to the protection and assistance given by the Imperial and Union Governments, and more especially as regards the disposal of gold by the various banking institutions in London and South Africa and to the hearty co-operation of all sections of employees. The urgency of keeping up the gold output was recognised by all concerned, and although the mines were deprived of many efficient men who proceeded on active service, who had to be replaced by less efficient men, the co-operation of the remaining employees (many of whom were equally willing to take their part in the field) enabled the output of gold to be fully maintained. In addition, the men who have been unable to go on active service have liberally subscribed to the various war funds—the employees of the Consolidated Gold Fields Group alone having subscribed to 31st July last no less than £11,204.

Gold Production.

The output of gold for the year under review was 8,394,573 fine ounces from 27,283,176 tons of ore crushed, representing an estimated profit of £11,820,000. These figures compare with 7,942,349 fine ounces, 24,828,788 tons ore crushed and £11,630,000 profit respectively for the previous twelve months. The improvement is accounted for by reason of the increase in the supply of native labour and the fact that during last year two additional companies entered the producing stage, viz., Government Gold Mining Areas, and Modderfontein Deep Levels; also there were no labour troubles to cause interruption to continuous working. For the past six months the output of gold has been at the rate of about 8,785,000 fine ounces per annum, or some 220,000 fine ounces above the average of the two years ended 31st July, 1913. (The figures for the 1914 period have been omitted as the gold outputs for that year were seriously affected in consequence of labour strikes.) The average recovery value of the Witwatersrand Gold Mines for the twelve months ended 31st July, 1915, shows a decrease of about 1s. per ton as compared with the previous twelve months, being 25s. 10d. as against 26s. 10½d. per ton crushed. The working costs for the same period were 17s. 2d. as against 17s. 6d. per ton previously, or a reduction of 4d. per ton. The profit was therefore 8s. 8d. per ton, or about 8d. lower than for the previous year. It is difficult to give entirely accurate figures as to the extent to which working costs on the average throughout the year under review increased in consequence of higher costs, freight, etc., of oversea stores, and also explosives, because, owing in many cases to large stocks on hand in South Africa, the gold mines were not affected by increased prices until some time after the outbreak of war. The additional cost per ton crushed on this account must differ on individual mines according to their various requirements and to the scale of operations, but calculations recently made in respect of some of our own companies show that at the present time there is an increase of about 6d. per ton crushed, as compared with the pre-war period. There is likely to be a still further increase in the price of stores and commodities essential to the operations of the mines, more especially in such lines as are also necessary for the making of munitions of war, and therefore it is quite possible that during the current year the extra cost will be represented by nearer 1s. than 6d. per ton crushed. Meanwhile, every effort compatible with efficiency is being exerted in the direction of economising the consumption of stores. At the same time our engineers, by laboratory investigation and experiment, are endeavouring to find cheaper substitutes for certain chemical commodities, the prices of which have risen considerably, whilst in one or two instances the supply has been cut off entirely.

Gold Fields Subsidiaries.

As to the companies (excluding Jupiter) of our own group, the ore crushed during the past twelve months was 3,387,215 tons, as against 3,156,760 tons for the previous year—an increase of 230,455 tons. The average grade of the ore milled showed an improvement of ·194 dwt., equal to 9¾d. per ton crushed. Working profits for our companies (still excluding Jupiter) for the 1913-1914 period were £847,309, whereas for the past year they were £924,399, equal to an improvement of £77,090—the comparative costs and profits for the past two years being as under:—

	For year ended 31st July, 1914. Per ton crushed.	For year ended 31st July, 1915. Per ton crushed.
Revenue	19s. 3·112d.	19s. 11·480d.
Working costs ...	13s. 10·693d.	14s. 5·982d.
Profit	5s. 4·419d.	5s. 5·498d.

Thus, although the working costs increased by 7·289d. per ton crushed, the working profit per ton was slightly higher than for the previous year by 1·079d. per ton. The general increase in working costs was anticipated in view of the circumstances already referred to, but, as will be seen from the Superintending Engineer's report, the costs of three of our subsidiary companies were adversely affected by exceptional causes other than those incidental to the war. It is satisfactory to be able to report that the average working costs for our crushing mines on the Rand were 14s. 1·536d. per ton crushed, as compared with 17s. 2d. for the average of the whole of the gold mines on the Witwatersrand, or 17s. 7d. per ton if we exclude our companies and take the remaining gold mines.

Native Labour.

As regards native labour, the number of boys coming forward for work on these fields has been highly encouraging. In July, 1914, the total employed on the Witwatersrand gold mines was 170,407, while for July, 1915, it was 189,905, or an increase of 19,498. The following comparative figures show the number of natives employed by our own group of mines:—

	Complement (*i.e.*, Number of natives required).	Natives employed.	Percentage of Complement.
At 31st July, 1914 ...	23,535	15,055	63·97
At 31st July, 1915 ...	27,100	19,855	73·27
At 31st August, 1915 ...	27,100	21,760	80·30

This steady increase in the supply of native labour, which at the time of writing seems likely to continue during the current year, can be put down to the failure of crops in the native territories last season, and more recently to natives previously employed on diamond mines (where the work is more congenial) who were remaining at home in hopes of the diamond mining industry being re-started, now finding it necessary to seek work elsewhere. The operations of the Native Recruiting Corporation continue to give satisfaction, although the cost of recruiting has not been reduced to the extent it was hoped; but this, to some extent, is due to the extra expense incurred by the greater care and supervision now being exercised as regards the health and general condition of the natives before they are permitted to commence work on the mines. On the other hand the mines have benefited owing generally to the better physical fitness of the boys on arrival, and consequently the considerable loss which was formerly shown by reason of many natives, on whom capitation fees had been paid, proving within a short period incapable of mine work, has now been largely reduced. The satisfactory conditions of employment on the Rand for natives are evidenced by the fact that the number of boys who voluntarily come up to work on the mines (*i.e.*, not through the agency of a recruiter) from the Provinces in the Union is steadily increasing, whilst of the natives from Portuguese territory, who are recruited by the Witwatersrand Native Labour Association, about 80 per cent. is represented by those who have previously worked on these fields. The health of all employees on the mines continues to receive close and constant attention, and every reasonable step is taken to improve the conditions under which they work and live. The Chamber of Mines has appointed a Permanent Committee of Mine Medical Officers to advise and assist in the various problems arising out of the medical treatment of natives, and this Committee is proving of great value to the industry. The death rate from disease during the year under review among all natives employed by the mines which are members of the Witwatersrand Native Labour Association was 14·99 per thousand per annum, as against 16·09 for the previous year, which latter was at the time the lowest annual death rate on record. The accident death rate among natives on our group of mines for the year ended 31st July, 1915, was 2·70 per thousand per annum. This compares with 3·58, the figure in respect of all mines which are members of the Witwatersrand Native Labour Association.

Robinson Deep, Booysens Estate, South Deeps.—As the outcome of continued negotiations a provisional agreement was recently concluded by all parties concerned for amalgamating the interests of the Robinson Deep Gold Mining Company, Ltd., Booysens Estate, Ltd., South Deeps, Ltd., and the owners of Booysens Freehold. It is proposed to form a new company with a capital of £925,000 to acquire (a) all the assets of Robinson Deep Gold Mining Company, Ltd., and (b) the claims and mynpachts (equal in all to 342·247 claims) and freehold interests (equal to 299 morgen 445 square roods) of the remaining parties. The proposed capital would consist of 500,000 "A" shares of 1s. each (£25,000) with cumulative preference rights, and 900,000 " B " shares of £1 each. The "A" shares (the holders of which, other than the Consolidated Gold Fields, will have the right to convert in December, 1919, one-half thereof for " B " shares, share for share) represent the consideration to Robinson Deep Gold Mining Company, Ltd., carrying dividends of 8s. per share per annum for 4½ years, as from the 1st July, 1915; 3s. per share per annum for 17 years as from the 1st January, 1920; and thereafter diminishing dividends until 31st December, 1940, when the shares will be extinguished and the face value repaid. As to the " B " shares, Booysens Estate, Ltd., and South Deeps, Ltd., will receive 666,000, while 15,800 will accrue to the owners of the freehold of Booysens, and the remaining 218,200 will be held in reserve. Under the proposed arrangements present holders of shares in Robinson Deep will, it is considered, be placed in a better position than if their property were worked independently. In the latter case it has been estimated that dividends averaging approximately 17½ per cent. per annum could be paid over a life of 8½ years from 1st July, 1915. They are now offered cumulative preferential dividends which would return them an equivalent amount in about 12 years and further annual amounts for 13 years thereafter. In addition, the right to exchange half their holding of "A" shares for " B " shares, which they can exercise at a time when it will be possible to make a closer estimate than at present of the value of the Booysens claims, may possibly prove to be of considerable value.

The Jupiter Gold Mining Company, Ltd.—In view of the improved supply of native labour, arrangements were made for the re-opening of the eastern section of the Jupiter Mine, and for the time being operations will be confined to that area. With a view to economy, work will be carried on in conjunction with the Simmer Deep, whereby it is hoped to increase the margin of profit. Considerable preliminary work had to be completed, before crushing operations commenced, on the 1st September, and it is anticipated that the rate of crushing will reach at an early date from 20,000 to 25,000 tons per month.

Sub Nigel, Ltd.—During the year it was decided to increase the crushing capacity of this mine to 8,000 tons per month. Owing to the war, however, delays arose in connection with the delivery of certain portions of the plant so that it was not until July last that the work was finally completed.

MINERS' PHTHISIS.

This subject continues to receive most earnest attention. From the inception of the Compensation and Insurance Funds under the Miners' Phthisis Act, viz., 1st August, 1912, up to 31st July, 1915 (a period of three years) the disbursements by the Consolidated Gold Fields' subsidiary companies have been as follows:—To Compensation Fund, £88,664 6s. 1d.; to Insurance Fund, £37,251 13s. 8d.; total, £125,915 19s. 9d.; or an average of nearly £42,000 per annum, the figures for the past year being £49,206. The contributions by the mines to the Insurance Fund during the past twelve months were, in accordance with the Act, 100 per cent. greater than for the previous period, viz., 5 per cent. of the miners' wages as against 2½ per cent. hitherto, while the miners' contributions remain the same. In the three years in question our companies have also spent the following sums:—On dust allaying, £70,458 6s. 5d.; on ventilation underground, £22,849 19s. 4d.; in respect of the Miners' Phthisis Sanatorium, £2,162 17s. 8d.; equal to a total expenditure for the three years of £95,471 3s. 5d. As to the efforts to eliminate this disease, it is interesting to note that the Government Mining Engineer of the Union of South Africa states in his annual report for the year ended 31st December, 1914, as follows:—" The monthly returns of the Miners' Phthisis Board show that the number of awards to miners for phthisis, both in the initial and in the more advanced stages, is beginning to fall off substantially. This is an indication that the disposal of the large number of cases of miners' phthisis, accumulated over many years, is at last nearing completion. In future, therefore, the returns of the Board ought to reflect the current position, and to be an increasingly reliable index of the extent to which success is being attained by the more thorough measures initiated during the last few years for the eradication of the disease." In this connection it is gratifying to note that the President of the Chamber of Mines recently pointed out that since the commencement of the Miners' Phthisis Board on August 1st, 1912, until April 30th, 1915, the total number of applications disposed of by the Board per quarter had decreased by almost exactly one-half, which was a very large decrease—even when it was remembered that at the commencement of the Board's operations the accumulation of past cases would naturally inflate the number of applications received. The same decrease has been maintained for the quarter ended 31st July, 1915. The Miners' Phthisis Prevention Committee, of which your Superintending Engineer is a very active member, continues to do excellent work, and many improvements in health conditions underground, and on the surface where crushing operations take place, have been effected.

(To be continued.)

S.A. MINING YEAR BOOK.

1915.

By S. R. POTTER.

Vol. 1.

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Rhodesian Section.

RHODESIAN MINERAL OUTPUT FOR OCTOBER.

Official Returns of Gold and Other Minerals from Southern Rhodesia for the Month

We have received for publication from the office of the Rhodesia Chamber of Mines, Bulawayo, the following detailed statement of the mineral output for the month of October, 1915, with comparisons and values:—

MATABELELAND.

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Bulawayo District—				
Abercorn (W. J. Lane)	(5)	194	66·08	274
Agincourt (Hogg & Co.)	5	180	114·08	473
Antelope G.M. (Rhod.), Ltd.	2B 2P 2T	4,240	1,255·54	5,205
Do. (slimes)	—	3,900	801·50	3,323
Antenior (W. J. Lane)	5	116	39·16	162
Do. (sands)	—	247	20·47	85
Bassick (Bassick Mine Synd.)	5	330	87·34	362
Big Ben (W. E. Hunt)	4	140	46·42	193
Do. (sands)	—	540	120·00	497
Blanket (Blanket Syndicate)	15	1,020	142·88	592
Bon Accord (J. Gibson)	2	12	91·91	381
Bulawayo Main A. (Aserman and Cormack)	2	216	48·70	202
Do. (sands)	—	180	52·20	216
Bunney's Luck (W. H. Rabbets), sands	—	300	35·56	147
Camp (September and October), Carson Mines, Ltd.	5	1,042	203·11	842
Do. (sands)	—	320	24·72	102
Carry (Boomerang Syndicate)	1 H	273	273·13	1,132
Do. (sands)	—	175	78·91	327
Cecil (Master Cecil Syndicate)	3	30	17·64	73
Coquette (W. H. Robinson)	2	192	43·59	181
Cottage (Cottage Syndicate)	4	264	65·06	270
Do. (sands)	—	159	11·91	49
Diablo (H. W. Bearcroft)	5	15	15·44	64
Dobie (Carson Mines, Ltd.)	5	838	102·41	424
Durban (Durban Syndicate)	2	126	263·33	1,092
Do. (sands)	—	80	79·73	330
Eagle (E. Sutherland)	—	—	3·26	13
Eagle A. (Macdonald & Co.)	10	1,073	220·62	914
Do. (sands)	—	390	20·02	83
Edward (Warren & Guest)	5	450	120·30	499
Elumba A. (E. W. Bosomworth)	5	100	32·83	136
Ettie (Ettie Syndicate), sands	—	600	47·64	197
Excelsic (Excelsic Syndicate)	2	40	12·87	53
Farvic (H. S. Henderson)	5	924	451·88	1,916
Do. (sands)	—	367	34·83	148
Flora (J. L. Henderson)	2	100	63·67	264
Fred (Transvaal & Rhod. Estate)	10 2P	2,000	763·29	3.164
Do. (sands)	—	2,000	220·82	916
Godwin B. (Barrett & Stacey)	5	276	211·99	879
Do. (sands)	—	390	40·23	167
Great Belingwe (R. C. Boyes)	5	207	83·20	345
Hildata (R. Aserman)	5	571	90·11	374
Do. (sands)	—	180	31·21	129
Intabanenda (Intabanenda Synd.)	5	453	95·25	395
Do. (sands)	—	230	19·42	80
Inspector (W. H. Fletcher)	3	68	37·67	156
Jeffs (Hortor & Stewart)	3	96	98·29	407
Jumpers (J. P. McCay)	5	500	308·65	1,280
Do. (sands)	—	210	62·36	259
Kernel (E. Farrar)	5	100	22·99	95
Lone Hand (Armstrong & Furber)	5	420	138·56	574
Lonely Reef G.M. Co., Ltd.	20 3T	4,750	582·57	2,415
Do. (slimes)	—	4,750	2,472·00	10,248
Lonely Star (E. K. Jubber)	5	48	11·37	47
Liberty (M. P. L. Syndicate)	1 H	300	15·63	65
Mamba (Nicholls & Co.)	5	192	98·83	410
Do. (sands)	—	120	26·25	109
Matabele 3 (Criterion G.M., Ltd.)	10	779	50·98	211
Matabele Queens Co., Ltd.	10	1,800	362·70	1,503
Do. (sands)	—	1,800	362·70	1,503
Mayfair (Arbery & Hicks), Sept.	5	450	85·19	353
Do. (sands)	—	250	58·93	244
Do., October	—	607	69·05	286
Do. (sands)	—	360	21·42	89
Mulloch (J. B. Richardson)	2	13	17·11	71
Nelly (F. D. Roscoe)	3 H	977	374·69	1,553
Do. (sands)	—	420	195·18	809
New Eclipse (J. R. Stewart)	5	732	106·69	442
Nicholson (Cunningham and Allison)	15 1C	1,632	150·00	622
Northumbrian (R. Martindale), clean-up	—	—	22·41	93
Old Nic. (Chart. & Gen. E. and F. Co., Ltd.)	15 4P	2,482	467·52	1,938
Do. (sands)	—	1,219	135·62	562
Olympus (clean-up)	—	—	28·49	114
Peach A. (Peach Syndicate)	5	351	521·45	2,162
Penzance (Macdonald & Co.)	2	220	26·21	109
Do. (sands)	—	140	31·01	129
Petrel (M. J. Rooke)	5	290	150·10	622
Prince Olaf (K. Johnsen)	5	307	351·96	1,459
Princess 2 (C. A. Abbott)	2	81	7·89	33
Do. (sands)	—	170	14·51	60
Queens West (Cumings & Berry)	3	244	95·58	396
Do. (sands)	—	302	57·63	239
Rosy Morn (J. W. Rose)	2	28	7·75	32
Rubble (J. G. Urin)	5	130	18·64	77
Sabi Extra	3	50	102·98	427
Sinti (Gillman & McDonald)	1 C	40	4·74	20
Slope I. (E. E. Beecroft)	5	610	91·18	378
Southern Cross (E. Basch)	5	500	84·53	350
South City (Smith & Bowly)	4	62	25·82	108
Stock's Luck, etc. (E. W. Bosomworth)	—	300	37·54	156
Susanna Mines, Ltd. (sands)	—	—	13·62	57
Star (Romola Nigel G.M. Co.)	5	395	98·03	406
Do. (sands)	—	170	26·00	108
Teutonic (B. & B. Syndicate)	5	330	64·29	267
Unique	2	65	16·30	68
Wolley Dog (P. H. Davis)	2	300	374·26	1,551
Bulawayo district total			15,401·37	63,887
Gwelo District.—				
Alderman (Williams & Woodger)	3	200	41·89	174
Bell Reef Dev. Co., Ltd.	2B 1T	3,638	1,396·60	5,790
Bonsor B323 (Cornish Syndicate)	10	970	139·30	577
Do. (sands)	—	900	58·56	243
Bonsor B327 (T. Roberts)	10	780	89·64	372
Cactus (Renton & Grey)	5	340	61·45	255
Do. (sands)	—	320	35·82	148
Camelia (S. Levin)	10	1,008	353·01	1,463
Do. (sands)	—	600	32·50	135
Collingwood (Pini & Wearing)	5	536	42·16	175
Csardas (Wolfshall Syndicate)	10	616	549·25	2,277
Do. (sands)	—	450	110·42	458
Do. (slimes)	—	166	17·26	71
Dream (Dream Tribute Syndicate)	5	180	56·32	230
Do. (sands)	—	80	6·60	26
Eileen (M. L. Price)	5	700	52·02	216
Emerald (Boston & Flann)	2	300	135·79	563
Do. (sands)	—	250	27·48	114
Falcon Mines, Ltd.	31 3T	19,086	3,591·44	16,679
Do., copper, £15,167.				
Fed Up (A. Malcolm)	5	220	87·13	361
Gaika G.M. Co., Ltd.	51 1C	3,180	1,520·88	6,388
Do. (sands)	—	1,352	116·57	490
Do. (slimes)	—	1,459	138·63	582
Do. (slags)	—	—	307·18	1,180
Glen Hume (Hume, Withey and Walker)	5	810	160·76	666
Glen Rosa (Glen Rosa Syndicate)	10	750	419·38	1,739
Do. (sands)	—	450	133·23	552
Globe and Phoenix G.M. Co., Ltd.	40 10P	6,502	4,986·41	20,943
Do. (sands)	—	4,368	1,598·47	6,714
Do. (slimes)	—	2,230	609·63	2,560
Do. (concentrates)	—	83	302·55	1.271
King Solomon (A. E. West)	5	210	46·95	195
Leopard (Leopard Trib. Syndicate)	5	680	164·14	680
L'Espoir (C. W. Harrower)	5	210	37·05	154
Lulu (C. W. Leppington)	2	162	166·79	691
Meg (J. M. Havnar)	2	512	68·08	282
Moss (W. M. James)	5	969	469·27	1,945
New Dunraven G.M. Co., Ltd.	5	820	121·45	503
Do. (sands)	—	850	38·44	159
Pacific (Wanderer Sel. G.M., Ltd.)	4GR	365	42·51	176
Pagamesa (W. H. Peard)	15 2P	650	217·48	902
Do. (sands)	—	551	98·53	408
Pondo (F. C. Luxat)	5	840	150·94	626
Do. (sands)	—	260	26·42	109
Romney (T. Pedlow)	5	293	104·49	433
Selukwe-Columbia G.M., Ltd.— Danga	10 1P	196	55·93	232
Do. (sands)	—	104	28·39	117

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Wonderland	—	1,369	406·05	1,683
Do. (sands)	—	762	206·05	854
Yankee Doodle	10	1,464	180·22	747
Do. (sands)	—	1,005	108·01	448
Sheba (S. A. Wakes)	—	213	21·80	90
— (A. E. West)	(5)	—	33·20	138
Surprise (W. T. Woods), sands	—	560	25·95	108
Tabekwe (A. N. Tyrrell)	20	2,240	391·26	1,622
Taxul (F. C. Luxat)	1 H	520	82·95	344
Do. (sands)	—	420	45·34	188
Trepolpen (C. T. Uren), September	2	12	4·18	17
Umpali (Bolt & Franke)	5	350	86·14	357
Do. (sands)	—	280	14·86	62
Veracity (L. R. Evans)	2	150	95·48	396
Do. (sands)	—	288	70·22	291
Walrus (L. R. Evans)	6	110	33·37	138
Wanderer (Selukwe G.M., Ltd.)	4GR	11,218	1,154·62	4,786
Zabonkwe (Holmes & Urquhart)	5	810	70·62	254
Do. (sands)	—	620	285·91	1,185
Gwelo district total			22,331·42	94,732

Matabeleland total ... 37,732·79 ozs.
Value ... £158,619

MASHONALAND.

HARTLEY DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Agnes (P. S. Triggs)	5	440	282·67	1172
Do. (sands)	—	486	24·97	104
Arlandzer (Keir & Rooke)	10	1,700	89·57	371
Do. (sands and slimes)	—	1,700	233·42	968
Baltimore & Virginia (P. A. Enke)	5	435	37·73	156
Bijou (R. McInnes)	2	120	59·00	245
Bonheur (T. H. Long)	2	20	35·23	146
Brilliant (Mabel's Luck Synd.)	5 1P	776	132·32	548
Do. (sands)	—	563	118·24	490
Brompton (R. R. Aitken)	5	790	148·66	616
Do. (sands)	—	560	57·63	239
Buffalo (E. A. Begbie), September	5	590	129·03	535
Do., October	—	400	99·68	413
Cam & Motor G.M. Co., Ltd.	Roasting	12,108	4,570·62	19,379
Do. (slimes)	—	410	46·84	199
Chadshunt (C. H. Wheildon)	5	430	283·37	1,175
Do. (sands)	—	255	57·17	237
Cheshire Cat (Arnold & Windley)	—	—	1·14	5
Concession Hill & W. Ext. (C. E. Simpson)	5 1C 2P	1,688	289·83	1,201
Do. (sands)	—	1,020	66·18	274
Dalny (Macdonald & Sale)	5	1,823	85·36	354
Do. (sands)	—	1,553	154·80	642
Dalny 1 W. (Macdonald & Sale)	5	540	90·99	377
Do. (sands)	—	270	60·20	250
Dawn (Arrow Synd.), September	5 1P	929	221·89	920
Do. (sands)	—	929	27·51	114
Do., October	—	901	215·23	892
Do. (sands)	—	901	38·29	159
Dreadnought	5 1C	300	44·11	183
Eiffel Blue (Willoughby's Cons. Co.)	10	1,360	802·18	3,325
Do. (sands)	—	780	47·62	197
Eiffel Blue (P. G. Owen), slimes	—	520	19·80	82
Eileen Alannah Mining Co., Ltd.	12 2T	3,390	644·68	2,672
Do. (sands)	—	4,336	1,311·54	5,437
Enny Ext. (E. G. Goodyer)	5	600	145·80	604
Do. (sands)	—	480	38·16	158
Eureka (W. H. Halkett)	—	—	1·21	5
Excelsior (Smith & Heard)	2	74	24·36	101
Giant Mines of Rhodesia, Ltd.	30 2T	9,500	1,869·02	7,688
Glasgow Mines, Ltd.	5	560	122·48	508
Do. (sands)	—	252	52·99	220
Glencairn (Glenrosa Mines, Ltd.)	5	753	542·02	2,247
Golden Valley (J. Mack)	10	1,225	553·89	2,296
Do. (sands)	—	708	152·88	634
Guelph (J. & M. Davidson, September and October	3	240	64·34	267
Inez (Harrill & Smith), clean-up	—	—	7·21	27
Inez (L. Hyland)	10	1,200	238·33	988
Do. (sands)	—	760	91·33	379
Jess (E. Jessop), clean-up	—	—	3·34	14
Kanyemba (Kanyemba Syndicate)	10	950	431·95	1,791
Do. (sands)	—	680	107·67	446
Mudale (E. A. McDowell)	5	450	98·40	408
Old Chum (F. E. West), September	5	300	48·95	203
Do. (sands)	—	350	23·85	99
Old Chum (F. E. West)	5	150	44·54	185
Do. (sands)	—	300	31·57	131
Oleander (O. T. de Villiers)	3	350	73·38	304
Owl (A. Rolfe)	10	1,558	922·59	3,825
Do. (sands)	—	1,390	677·53	2,804
Pomposo (J. Knott)	5	326	152·53	632
Poverty (D. J. Laing)	5	650	108·24	449
Profit (Dum Syndicate)	5	43	4·33	18
St. George (Hussey & Fraser)	2	110	92·29	383
Seigneury (Seigneury Syndicate)	5	1,100	222·21	921
Do. (sands)	—	932	24·85	103
Seven Sevens (7 7's Syndicate)	3	73	57·4	26
Shepherds (Phoenician (Rhod.) Co.)	5 1T	920	200·67	831
Do. (sands)	—	920	105·41	437
Thistle-Etna G.M., Ltd.	1 C	1,338	242·89	1,008
Do. (sands)	—	1,544	107·96	448
Trinidad	5	160	48·20	200
Village Main I. (Bruce & Buchanan)	5	475	98·48	408
Village Main (Cuba Syndicate)	5	400	49·70	206
Washington (I. J. Minnaar)	5	450	71·47	296
Do. (sands)	—	350	49·68	206
What Cheer (H. Moser)	5	428	258·26	1,070
Do. (sands)	—	675	137·93	572
White Rose	2	270	38·80	160
Hartley district total			18,914·92	78,788

LOMAGUNDI DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alluvial (W. Kelly)	—	—	4·56	19
Alluvial (G. Blacklaws)	—	—	16·20	67
Alluvial (N. Griffith)	—	—	6·48	27
Alluvial (O. Brin)	—	—	69·83	289
Alluvial (R. G. Harding)	—	—	92·29	382
Alluvial (P. J. Purcell)	—	—	4·06	17
Alluvial (L. Schapke)	—	—	15·69	65
Eldorado Banket G.M. Co., Ltd.	20 1C 4P	4,043	1,779·65	7,474
Do. (sands)	—	4,036	885·20	3,718
Golden Kopje Prop. Mines, Ltd.	60 2T	10,253	1,135·49	4,769
Do. (slimes)	—	10,253	1,310·11	5,503
May (May Syndicate)	5	400	73·22	304
Do. (sands)	—	430	68·67	284
Medway (F. L. Standen)	5	339	63·58	264
Mediteraneo (J. Perhat)	2	100	48·87	203
Lomagundi district total			5,573·90	23.385

MAZOE DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alluvial (J. A. Broodryk)	—	—	16·33	68
Botha H. (Clarkson & Sons)	1 H	1,650	34·95	145
Do. (sands)	—	690	78·66	326
Blue Lagoon (Violet Lagoon Synd.)	2	150	17·92	74
Do. (sands)	—	200	20·13	83
Chin (Arrow Syndicate, Ltd.)	—	611	148·00	613
Do. (sands)	—	611	22·33	93
Day Dawn (Day Dawn Tribute)	2	231	71·97	298
Do. (sands)	—	217	33·51	139
Jumbo G.M. Co., Ltd.	20	1,968	416·81	1,728
Do. (sands)	—	1,148	83·42	346
Do. (slimes)	—	820	37·56	156
Do. "Reno"	—	432	91·49	379
Do. (sands)	—	252	18·30	76
Do. (slimes)	—	180	8·24	34
Kimberley (Mash.) G.M. Co., Ltd.	8 2T	4,750	921·96	3,910
Do. (sands)	—	2,200	321·82	1,365
Do. (slimes)	—	2,550	251·27	1,066
Do. (slags)	—	—	203·30	813
Kingsley Hoard (A. S. Warwick), three months	5	1,292	200·70	832
Do. (sands)	—	1,650	74·05	307
May (R. Ricardo)	3	15	5·67	23
Micky (Micky Syndicate)	2	301	146·11	606
New Darwin (Howard & Southey)	2	142	41·40	172
Promoter (F. C. Croxford)	1 C	1,942	52·87	219
Do. (sands), B. H. Jones	—	1,900	89·82	372
Ravine (Q. H. Whiteford)	2	195	36·58	152
Shashi (C. Laland)	2	129	50·28	208
Syrian (F. A. Badenhorst)	—	60	13·10	54
S.D.C. 3 E. (B. G. Byerley)	1 H	989	81·54	338
Tat (W. M. Epton)	5	553	30·70	127
Venus (Giles & Southey)	2	150	47·18	196
Yellow Jacket (J. J. Barger), sands	—	120	5·22	22
Mazoe district total			3,673·19	15,340

SALISBURY DISTRICT.—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alpes (P. Zaffere)	5	201	169·54	703
Beatrice (Scott Syndicate)	10	570	99·05	410
Do. (sands)	—	460	35·86	149
Black Cat (Black Cat Syndicate)	2	260	82·12	340
Ceylon (Ceylon Syndicate)	1 P	615	112·28	465
Do. (slimes)	—	615	115·32	478
Cross-your-Luck (Sch. and District Mines)	2 1P	172	38·37	159
Do. (slimes)	—	317	93·13	386
Found A. (Grey's Syndicate)	2	210	94·11	390
Do. (sands)	—	200	58·29	242
Inyague 3	2	40	21·43	89
Joking (Harrison & Drabble)	2	97	259·65	1,076
Do. (sands)	—	110	50·89	211
Kenilworth (Kenilworth Synd.)	2	95	42·47	176
Koodoo (Est. R. Tyron)	5	314	145·62	604
Do. (sands)	—	640	118·03	489
Lienad	(5)	36	7·75	32
Mill (L. Chiappini), sands	—	600	27·95	116

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Mont d'Or (Claxton & Bussell) ...	5	377	108·72	451
Do. (sands) ...	—	496	24·86	103
New Agnes (Fungwe Dev. Synd.) .	5	336	42·54	176
New Full Back (N.F.B. G.M. Synd)	2	20	10·77	45
Olympus C. (D. Peridis), September and October ...	10	460	89·79	372
Planet (Planet Tribute Synd.) ...	10 1P	620	168·17	697
Do. (sands) ...	—	620	166·51	690
Radnor (London & Rhodesia M. & L. Co.) ...	5 2P	911	479·16	1,926
Shamva Mines, Ltd. ...	52·8T	47,050	2,732·13	11,475
Do. (sands and slimes) ...	—	47,093	5,731·90	24,074
Do. (slags, etc.) ...	—	—	604·37	2,405
Southern Cross (H. G. Bateman)...	10	73	42·19	175
Salisbury district total			11,772·97	49,165
Umtali District—				
Black Jester (J. Wilesmith) ...	5	150	3·34	14
Blue Peter (A. P. Prior) ...	5	227	24·41	101
Constance (J. F. Kapnek) ...	5	1,310	179·35	743
Eyewitness (T. D. Maclean), pan'gs	—	—	10·89	45
Florence (P. M. Branken) ...	5	74	28·85	120
Grand Manika (Grand Manika Snd)	5	350	53·84	223
Do. (sands) ...	—	150	7·00	29
Liverpool (R. G. Snodgrass) ...	5	680	145·21	602
Do. (sands) ...	—	280	75·83	314
Montezuma G.M. Co., Ltd. ...	10	1,250	105·55	438
Pilgrim 2 E. (O. R. Cawood) ...	5	400	47·20	196
Rezende Mines, Ltd. ...	—	12.000	1,136·36	4,822
Do. (sands) ...	—	3,257	290·95	1,234
Do. (slimes) ...	—	1.552	148·37	630
Do. (concentrates) ...	—	150·5	539·11	2,269
Umtali district total			2,769·26	11,780
Victoria District—				
Empress (S.A. Pros. & Con. Synd)	8	1.490	174·54	724
Do. (sands and slimes) ...	—	1,470	144·15	597
Sunbeam (Douglas & Durrell) ...	5	698	300·70	1,246
Texas (P. S. Warden), sands ...	—	120	20·75	86
Wake Up John (S. Hemlock) ...	2	203	57·12	237
Victoria district total			697·26	2,890
Mashonaland total ...			43,428·50 ozs.	
Value ...			£181,346	
Grand total ...			31,161·29 ozs.	
Value ...			£339,967	

GRAND TOTAL.

	Quantity.	Value.
Gold, ozs. ...	81,161·29	£339,967
Silver, ozs. ...	17,606·81	2,100
Copper, tons ...	314·44	15,571
Chrome iron, tons ...	9.744·00	21,760
Coal, tons ...	39,621·00	11,760
Asbestos, tons ...	224·75	3,596
Lead, tons ...	1·74	38
Diamonds, carats ...	22·25	78
		£394,860

In addition, on adjustment with account sales over a period of seven months, 6·97 tons of copper were declared, and an under-declared value of £42,129.

GOLD OUTPUT COMPARISONS.

	Ozs.	Value.
September, 1915 ...	76,929·45	£321,085
October, 1915 ...	81,161·29	339,967
Increase ...	4,231·84	£18,882

C: Chilian Mill. T: Tube Mill. G.R: Gates Roll. H: Huntington Mill. P: Grinding Pan. Pn: Pneumatic Mill; D: Dolly.

Grand totals to date.—Gold, £32,021.304; silver, 2;019,671 ozs.; lead, 7,093 tons; copper, 4,271 tons; chrome iron, 376,117 tons; coal, 2.261,234 tons; tungsten ores, 129·10 tons; antimony, 13·75 tons; arsenic, 76 tons; asbestos, 3,128 tons; diamonds, 10,760·75 carats; other precious stones, 90,069·50 carats.

LATEST RHODESIAN MINING NEWS.

Future of Rhodesia—South African Option Syndicate— Trinidad and Golden Valley— Eileen Alannah.

Colonel Raleigh Grey, of Rhodesia, interviewed by Reuter in London last week, emphasised that Rhodesia's contribution, both in men and material, had been noteworthy. The fact was one-tenth of Rhodesia's population was under arms, while the colony had given between £30,000 and £40,000 sterling, besides three motor ambulances and four aeroplanes. The spirit of the natives was extremely good. The war, he considered, must result in increased importance for Rhodesia. He believed the Government of Northern and Southern Rhodesia and Nyasaland would be brought under one administration—Sir Starr Jameson is said to be visiting Rhodesia in connection with this proposal—which in future would also include suitable territories, such as the Caprivi strip in the South-West Protectorate, and part of German East Africa. In conclusion, he affirmed he was more than ever opposed to the amalgamation of Rhodesia with the Union, especially as the Union, with the South-West Protectorate, was sufficient for one administration. He believed the inclusion of German East Africa would be most beneficial to trade, and facilitate the completion of the Cape to Cairo route.

* * * *

The Trinidad was only able to do twelve days' crushing towards the October output. This was due, says the Gatooma paper, to the fact that the concrete piles, on which the mill was originally erected, were found to be a failure. The whole thing had to be dismantled and the orthodox wooden piles substituted. Now the battery is working excellently. An addition to the reduction plant on the Golden Valley has been installed and commenced running this week. It is a " Record ' concentrating table by Messrs. Fraser & Chalmers, and so far has given Mr. Mack every satisfaction. It is a machine which has done good work on the Globe and Phoenix and Falcon Mines.

* * * *

The annual meeting of the Eileen Alannah Mining Company, Ltd., was held at 2, London Wall Buildings, E.C., in mail week. The report for 1914 shows a credit balance of £20,692, and, after writing off the balance of the expenditure and development account brought forward from 1913, £19,876 remains. The directors propose to carry this amount forward During the year 25,098 tons were crushed, realising £50,709. The installation of the new plant is now complete.

* * * *

The ordinary general meeting of the South African Option Syndicate, Ltd., was held in mail week in London. Mr. Julius Pam presided, and moved the adoption of the report for 1914, which showed that during the year 38 diggers holding licences were engaged at work on the company's selected area of 12½ square miles. The total number of diamonds recovered was 770, weighing 975 carats, of an estimated value of £3,893. The report was adopted.

WRIGHT'S ROPES.

YIELD, COSTS, AND PROFITS IN OCTOBER.

Official Analysis by the Transvaal Chamber of Mines.

The monthly Transvaal Chamber of Mines analysis of gold production in the Transvaal for October, 1915, shows, *inter alia*:—

THE WITWATERSRAND.

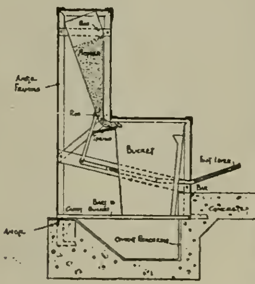
	Tons.	Value. £	Ounces.	Yield per ton. s.	d.	Cost per ton. s.	d.	Profit.
Aurora West United ...	15,200	17,021	4,007	22	3	18	1	3,122
Bantjes Consolidated ...	20,490	22,853	5,380	22	4	21	1	759
Brakpan Mines	64,000	90,859	21,390	28	4	17	9	33,111
City and Suburban	28,400	51,423	12,106	36	3	21	0	20,538
City Deep	63,000	125,219	29,479	39	9	19	9	60,501
Cons. Langlaagte	54.100	68,618	16,154	25	4	15	3	27,334
Cons. Main Reef	29,130	42,881	10,095	29	5	19	3	13.934
Crown Mines	221,000	281,790	66.339	25	6	16	2	97,331
Durban Roodepoort ...	14,354	14,574	3,431	20	4	15	9	3,262
Durban Rood. Deep ...	27,000	38,077	8,964	28	3	23	5	5,664
East Rand Propy.	197.600	238,128	56,060	23	11	17	11	55,970
Ferreira Deep	57,880	104,312	24,557	35	9	20	4	42,552
Geduld Propy.	27,200	43,684	10,284	32	1	22	0	13,581
Geldenhuis Deep	59,000	76,149	17,927	25	10	20	7	13,830
Ginsberg	15,800	17,913	4,217	22	8	17	9	3,920
Glencairn Main Reef ...	21,850	14,897	3,507	13	4	11	2	2,304
Government Areas	50,200	70.274	16.544	28	0	21	9	15,638
Jupiter	21,000	19,608	4,616	18	8	19	8	*1,396
Knight Central	29,020	32,202	7,581	22	2	18	11	4,052
Knights Deep	110,000	89,763	21,132	16	3	12	2	16,061
Langlaagte Estate	52,608	60,203	14.173	22	9	17	1	14,035
Luipaardsvlei Estate ...	22,140	24,807	5,840	22	3	18	1	4,356
Main Reef West	26,520	28,855	6,793	21	9	18	5	3,839
May Consolidated ..	14,500	11,482	2,703	15	10	14	5	1,004
Meyer and Charlton ...	14,990	34,339	8,084	45	10	17	6	20,831
Modderfontein B.	45,500	100,828	23,737	44	4	15	2	64,182
Modder Deep Levels ...	34,700	63,814	15,023	36	5	16	9	34,559
New Goch	30,700	29,802	7,016	19	5	13	8	8,573
New Heriot	13,800	24,339	5,730	35	3	20	10	9,507
New Kleinfontein .	55,750	71,281	16,781	25	7	17	0	23,024
New Modderfontein ...	53,000	106,563	25,087	40	3	17	4	58,431
New Primrose	22,500	18,295	4,307	16	3	11	11	4.874
New Rietfontein	—	1,746	411	—		—		*443
New Unified	13,750	14,243	3,353	20	2	13	5	4,779
Nourse Mines	59,300	73,337	17,265	24	9	19	9	13,289
Princess Estate . .	23,000	28.804	6.781	25	0	24	8	340
Randfontein Central .	217,400	264.693	62.314	24	2	17	8	66.622
Robinson .. .	60,700	78.523	18,486	25	10	13	1	37,197
Robinson Deep	59,200	78,868	18.567	26	8	17	8	25,034
Roodepoort United	34,931	32,640	7,684	18	6	17	5	2,066
Rose Deep	70,100	82,559	19,436	23	2	16	9	21,814
Simmer and Jack ..	70,500	74,199	17,468	21	1	14	1	27,269
Simmer Deep	71,300	53,925	12.695	15	0	14	8	1,813
Van Ryn	38,810	47,524	11,188	24	6	14	2	19,647
Van Ryn Deep	40.260	78,766	18,543	39	2	18	1	42,289
Village Deep	54,400	78,570	18.497	28	11	19	0	25.197
Village Main Reef	11.200	20,317	4,783	36	3	43	1	*4.244
Vogelstruis Estate ...	13,857	14,710	3,463	21	3	19	4	1,344
West Rand Central	1,692	2,459	579	29	1	27	8	115
West Rand Cons.	31,750	42,171	9,928	26	4	17	11	13,300
Witwatersrand	43,130	55,220	13,000	25	1	14	10	23,291
Witwatersrand Deep ...	43,850	56,486	13,298	25	9	17	11	16.050
Wolhuter	35,600	44.389	10,450	24	11	16	7	13,920
Miscellaneous producers	—	10,891	2,565	—		—		—

OUTSIDE DISTRICTS.

	Tons.	Value. £	Ounces.	Yield per ton. s.	d.	Cost per ton. s.	d.	Profit
HEIDELBERG—								
Nigel	11,300	13,567	3,194	24	0	26	0	*1,282
Sub Nigel	7,770	15,449	3,637	39	9	29	1	3,231
BARBERTON—								
Barrett	3.869	1,716	404	8	10	—		—
Fairview (T.C.L.)	1.800	3.007	708	33	5	29	2	306
Sheba	6,988	11.057	2.603	31	8	25	9	2,075
Worcester Exploration..	5,700	4,286	1,009	15	0	13	6	412
KLERKSDORP—								
Quest	3,542	2,672	629	14	4	14	4	123
LYDENBURG—								
Ceylon Lydenburg	—	310	73	—		—		—
Glynn's Lydenburg ...	4,178	6.707	1.579	32	1	19	2	2,613
Rietfontein (T.C.L.) ...	988	1,686	397	34	2	23	0	11
Transvaal G.M. Estates	13,815	29,883	7,035	42	5	23	6	12,421
Miscellaneous producers	—	27,889	6.565	—		—		—

Improved Sanitation Underground on the Rand

THE O'BRIEN IMPROVED PATENT DRY EARTH CLOSET SYSTEM.



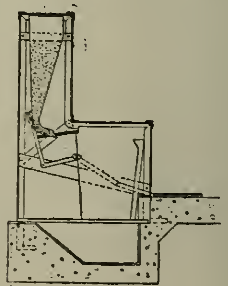
SECTION showing Hopper and Gearing in position of rest, or immediately after foot lever has been released.

The O'BRIEN Premier Dry Earth Closet System has undoubtedly proved itself to be the PREMIER of all dry earth systems, and only requires to be known on the mines to secure its general adoption.

THE PRINCIPLE OF THE SYSTEM IS THE SEPARATING OF THE LIQUID FROM THE SOLID OR FŒCAL MATTER, which is done by mechanism inside the pan. The Liquid is run into a chamber under or near the pan, which chamber is partly filled with a chemical absorbent preparation, and combining with the preparation thereby forms A PERFECTLY PURE, ODOURLESS SOLID, or by other means treated and allowed to flow away pure. The fœcal matter in the pan is automatically covered with a chemically prepared ash, rendering it absolutely odourless, and can be hoisted to the surface and carted away in open carts during the daytime.

The system itself is far superior to any other dry earth system, and has been largely ADOPTED BY THE SOUTH AFRICAN RAILWAYS and by the NEW SOUTH WALES GOVERNMENT FOR ALL BUILDINGS where no sewerage scheme is in use, also by MANY LEADING PUBLIC GENTLEMEN OF SOUTH AFRICA. In simplicity, cleanliness, and convenience it is far ahead of present practice.

Mr. DITCHFIELD will be happy to enter into Special Arrangements with Mines, Municipal and other Public Bodies, and, on application, will furnish estimates, and, if required, designs for the installation and maintenance of the system.



SECTION showing Hopper and Gearing in position while in use.

Original Testimonials received by us can be seen on application by anyone interested, at the offices,

Box 5408, Telephone No. 5649, JOHANNESBURG.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Recruiting v. Business—Another Good Word for Local Iron—Fencing Industry Come to Stay—Galvanised Goods Rising—Mining Poles Dearer—Effect of the Approaching Christmas.

The strenuous recruiting throughout the week has certainly interfered with business. It almost seemed that the whole town put aside much of the everyday routine work and gave itself up to assist the Military. The offices, as a rule, appeared less lively and created the idea that things were not as usual—something different, as it were; but the cause soon became apparent when the people left seemed proud to remark that such and such had joined the Forces. Out of one office alone no fewer than seven had signed on. Hence it is not surprising that the month opened badly as regards business. A group buyer remarked that the mines had plenty of stores, therefore, it would be a pity unduly to interfere with the recruiting for a few days, as most of the orders could easily wait; but the mines intended to keep stocks well in advance of the daily requirements. One bit of news picked up about town was that of a demand for pans and steam power from out Pretoria way, believed to be in connection with a salt and soda proposition; in any case, it is an industrial affair apart from mining. As a reflex of the local share market, there is an optimistic spirit being enfused into prospectors, some of whom are beginning to talk about proceeding into the Lydenburg-Zoutpansberg district, where so many small batteries have been absorbed from time to time.

Iron, Steel and Galvanised Goods.

It has been ascertained that high-speed steels are more easily obtainable on the Rand than in Great Britain; in fact, if some of our stocks of steel were returned to the manufacturers, it would be a very payable proposition, as our current values are from 2s. to 2s. 6d. per lb., whereas in Britain they range from 3s. to 4s. lb. Mild steel has risen about £2 per ton in the British market during the month of November, and the signs are that it will go higher, as so many iron workers are now in the munition factories. Notwithstanding our good supplies, on the whole, certain sizes are scarce, and those firms who secured contracts some time since have considerable difficulty in keeping strictly to sizes; however, consignments are now on the water, which will relieve the position. Steel plates are being supplied freely from America, therefore a feeling of confidence prevails under that heading. Train trucks, wheels and axles have advanced, as the British Government have commandeered these lines for light tracks for conveying supplies from a base to the trenches or near by. A buyer remarked, that as regards iron, he mostly bought the local article, as it was about 5s. per 100 lbs. cheaper. Now and again, for a special job, he bought a little Yorkshire iron, but that was only occasionally, as the local iron seemed to answer all ordinary purposes for mine work. Galvanised roofing iron and galvanised goods of all kinds, have, according to the latest cables, had a sharp rise, which to some extent has been reflected here, ranging from ½d. to ¾d. per foot as regards corrugated iron. However, the feeling amongst merchants is that values will soon advance, even higher than on the previous occasion, when there was such an outcry about spelter being held up for higher prices, assisted by the demand from the British Government.

Fencing and Mine Screening.

Quite a good industry in the manufacturing of wire fencing and mine screening, has been established in Johannesburg, as well as at the coast ports. It is stated that November was really a good month for supplying fencing for gardens of private residences, mostly the newly-erected, in the Northern as well as the Southern suburbs. At the moment, this industry is forcing itself into notoriety owing to the great advance in wire and standards. Fourteen-pound standards are not to be had at Durban, Port Elizabeth or East London. A decent consignment has been secured at Delagoa Bay. However, we have fair supplies in Johannesburg, as one broker turned over ten thousand during the present week. The pre-war price was 12s. 6d. per dozen as compared with 25s. now. All wire above 10 gauge is scarce and dear, as No. 12 and upwards are used for making the barbed article for military purposes. The smaller sizes have advanced 75 per cent. since the war, and the others 100 per cent. and more. For instance, No. 16 was 13s. per 100 lbs., and 32s. 6d. was paid for a small lot a few days ago. Obviously, there is none coming from the Continent or Britain, which is suitable for the trenches, and the American supplies have almost entirely been diverted to Europe. According to one statement, the American firms here are not bustling around at the moment American firms here are not bustling around at the moment for forward orders, but such a position can be relieved any day, as shipments of mining material arrive pretty regularly from New York. According to the information supplied by a local maker the fence-making trade has come to stay as a South African industry, as the machinery required for ordinary fencing is not very elaborate and, what is more, not very expensive. However, to expand the industry into mesh-making fencing, and that needed for fencing fowl-runs, as well as for many other things, will require up-to-date machinery, operated by power, instead of hand. From the interview it was gathered that the Oversea machinery is highly-perfected, as a different machine is used for each sized mesh. Much of this high-class work is done automatically in Britain and requires little supervision; therefore, it would appear that the machinery is of paramount importance to properly-found large works in South Atrica. In the meantime, it is pleasant to record that we are doing well, with a future so promising. Notwithstanding the advance in wire and the necessary standards, the South African price has not been risen in proportion to the present Oversea values, because of competition amongst makers and old importations, as well as business being checked by every rise, when the feeling amongst holders was to keep up returns, even at a little sacrifice. Farms and garden gates have advanced about 25 per cent. and ordinary fencing from 10 to 15 per cent. A commercial broker, when asked his opinion, replied that there should be a great future for the gate and fencing industry, and, although there is at present a sufficient margin of profit to induce a manager to start on his own, yet the competition is sufficiently keen to prevent prices running away, especially as the coast factories are very much alive to secure a share of our ready money market, especially in the mining trade. He further said that most of the mine screenings and other wire mesh work came from Oversea before the war, and now the question arises: how much can our makers do to retain the trade after the war?

Timber and Mining Poles.

There has been a slight advance in Baltic pitch pine logs, and the tendency is on the up-grade for all suitable big timber for the mines. The mining poles 8 ft. x 5 ins. have risen in Natal 5s. per big truck, with a decided advancing tendency, as the mines under the present regulations have to use more timber and poles for propping purposes. The price of deals, floorings and ceiling boards remains much the same, as the demand has slackened off for private dwellings, also there is not that brisk demand for Johannesburg made doors, frames, windows, etc. This feature will, undoubtedly, fit in with the less workers available here, now so many have joined the forces. Here again, the factories at the coast pretty well control values, but hopes are entertained that this comparatively new industry for Johannesburg will hold its own in the future, because there are ample funds behind the several ventures here. Nevertheless, the geographical position, railway rates, and the difference in the price of labour at the coast and here, are important considerations for our manufacturers to contend against.

Paints, Lead, Oils and Cement, Etc.

White lead has advanced another pound a ton in London; but the price remains the same here. Cement is extroardinarily scarce, so much so that two leading firms could not supply even a bag. Upon enquiry at the office, the answer was that their factories were turning out as much as ever, and something like pro rata distribution took place. However, they hoped to catch up their orders by the end of the year. Writing about the end of the year, a manager said that he thought their big business was pretty well finished for this year, as the paint clean-up for Christmas had taken place, and. although many jobs were in their finishing stages, yet it was not reasonable to expect fresh jobs for house repairs and paintings until the new year. At the time this enquiry was made a cable arrived stating that a shipping firm had sent a consignment of white lead to East London instead of Delagoa Bay, as there was so much red tape on in connection with Customs permits, each of which cost 5s. It appears that it is easier to send to a British port than a Foreign one, although little or no difficulty is experienced in obtaining permits for Delagoa Bay.

Revised Price List.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle, 17s. 6d. to 18s. 6d. per 100 lbs.; mild steel bar, 2¾d. lb.; drill, 4¾d. lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 22s.; do., ⅛ in. and 3-16 in., 21s.; ¼ in. and upwards, 20s.; 10 ft. x 5 ft. x 1-16 in., 23s. 6d.; ⅛ in. and 3-16 in., 22s. 6d.; ¼ in., 21s. 6d.; 10 ft. x 6 ft. x 1-16 in., 25s.; 3-16 and ⅛ in., 23s. 6d.; and ¼ in. up, 22s.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8d. to 8¼d., 11 ft., 8¾d., 12 ft. 9d.; 26 gauge, 6 ft. to 8 ft. 7d.; 9 ft. 6¼d., 10 ft. 7d.; flat galvanised, 18 to 24 gauge 28s. 6d.; 26 gauge 28s. 6d. to 29s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d. to 9¼d.; over, 9¾d. to 10d. (Oregon, 9⅝d.); flooring, 4½ x ⅞ and 6 x ⅞, 4⅜d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 6d. per cub. ft.; Oregon, 4s. 2d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 21s. to 22s. 6d., boiled, 24s. per 5 galls.; white lead, 52s. 6d. to 54s. per 100 lbs.; turps., 44s. to 48s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 19s. 6d. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 25s., do., 3/22, 21s.; tubing, 12s. 6d. to 15s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. 6d. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

The mail papers contain particulars of the death in action in France, at the age of twenty-four, of Sous-Lieutenant Robert Dreyfus, 303eme Regiment d'Infanterie, French Army. The son of Mr. and Mrs. Isidore Dreyfus, of Lancaster House, Porchester Terrace, W., the late Lieut. Dreyfus was well known to South Africans. His father has been connected with South Africa for some forty years, going out to Kimberley in 1875, at which centre he spent most of his time, during which he was actively associated with the De Beers Consolidated Mines, Ltd. On the outbreak of the war he took the first mail steamer back to rejoin the French Regiment in which he had completed his military service while in France, and which he had left with the rank of sergeant. He was in the fighting line without a break and without a single day's leave, from September of last year to the day of his death, and had been twice promoted, receiving commissioned rank purely for merit and good services rendered. His death occurred while leading his men in an attack on the German first line trenches, when he was shot through the right temple and killed instantaneously.

ANSWERS TO CORRESPONDENTS.

"Interested" (Germiston).—It is too early to expect results of boring on Reitfontein.

"Munitions."—Much good work is being quietly done; but, obviously, particulars cannot be published.

"Anxious" (Capetown).—The rate will be decided after the November profits are known. There is no reason to fear that the directors will not make the most liberal distribution possible.

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by Class, Private Tuition and Correspondence
SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - 60% ,,
MECH. ENGINEERS - June (Kimberl y Centre) - - ALL ,,
MINE OVERSEERS - - - - - - Practically ALL ,,
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THE WEEK IN THE SHAREMARKET.

Strong on Dividend Prospects—Springs the Feature—Bears Caught Napping.

THE promise of a good November output and the approach of the dividend season kept the market strong this week, with an improving tendency. Rand gold shares are taking on the character of "war-proof" investments and are in ever-increasing demand. Springs and Springs Options provided the sensation of the week, and proved the downfall of two prominent "bears" on the market. What was described as a little "submarine hunting" was indulged in to some purpose, and altogether the week has been the most interesting for some time. Rumours about Randfontein are rife, but the shares have not suffered. It is reported that all the mills at Randfontein, except the big central one of 600 stamps, are to be closed down; but we can obtain no official confirmation. Tin shares are still at low levels, and there are, of course, no dealings in copper counters on this side. The general tone and tendency are excellent, and should result in a good Christmas market.

A correspondent of the *Financial News* writes:—Now that the South African elections are over the confidence of investors has returned, and the "Cape" is again buying mining shares. This means that there is a following on this side. The argument in the market seems to be that though industrial securities may be compelled by force of circumstances to withhold dividends, the mining companies will continue to make distributions. We should like to suggest that the forthcoming division of profits may be on a less conservative scale than hitherto; investors would certainly be appreciative. While the demand is fairly general the favourites at the moment are City Deep, Van Ryn Deep, and Geduld. As the Stock Exchange makes a practice of discounting the future by purchasing in good time it is working out the effect of plant enlargement in the cases of the City Deep and Geduld.

	Frid. 26th.	Sat. 27th	Mon. 29th.	Tues. 30th.	Wed. 1st.	Thurs 2nd.
African Farms . . .	7 9†	8 0†	8 0†	7 6†	7 0*	—
Apex Mines	6 0*	6 3*	6 1*	6 0*	6 3	6 0*
Aurora Wests . . .	—	—	8 0*	8 0*	—	—
Bantjes Cons. . . .	4 4*	4 4*	4 3	4 3†	—	—
Brakpan Mines . . .	—	—	65 0†	65 0*	—	66 0*
Breyten Collieries .	—	—	20 0*	20 0*	20 0*	—
Brick and Potteries .	—	—	5 0*	—	—	—
Bushveld Tins . . .	0 3†	—	—	—	—	—
Cinderella Cons. .	3 0*	—	—	—	—	3 0*
City and Subs. . . .	43 0*	43 0*	43 0*	43 0*	42 6*	43 0
City Deeps	68 0*	68 0	67 9	57 3*	57 6*	68 6
Cloverfield Mines . .	5 4*	5 5*	5 9	5 9*	5 10*	6 0
Clydesdale Collieries.	14 6*	13 6*	13 0*	13 6*	14 6	—
Concrete Construction	—	—	—	—	—	2 6†
Con. Investments . .	13 6*	—	—	—	—	—
Con. Langlaagtes. .	36 6*	36 6*	36 6*	37 0*	36 6*	36 6*
Con. Main Reefs . .	19 0*	19 0*	19 0*	19 6	19 3	19 6
Con. Mines Selection	11 6	12 0	11 6*	11 9	11 6*	11 6*
Coronation Collieries.	25 0*	—	25 0*	—	—	—
Coronation Freeholds	0 2*	—	0 2*	—	—	—
Coronation Syndicates	—	—	—	3 0†	3 0†	3 0†
Crown Diamonds . .	1 9*	—	1 9*	2 0	1 9*	1 9*
Crown Mines	—	—	60 0*	—	—	60 0*
E.R. Centrals	3 0*	3 0	2 10*	3 1*	3 1	2 10*
E.R. Coals	1 9*	—	2 0†	2 0†	1 9*	1 9*
E.R. Deeps	—	1 3*	1 3*	1 3*	1 3*	1 3*
E.R. Proprietaries .	21 9*	22 6	22 0*	21 6*	—	—
E.R. Debentures .	£82½*	£82½*	£82½*	£83*	—	—
Eastern Golds . . .	1 3*	1 3*	1 3	1 4	1 5†	1 3*
Frank Smith Diamds.	1 6*	1 6*	1 6*	1 6	1 3*	1 6†
Geduld Props. . . .	33 9	35 6	36 0	35 6	35 6	36 3
General Minings . .	—	—	—	—	—	8 0†
Glencairns	—	2 3	2 0*	—	—	—
Glencoe Collieries . .	—	—	—	2 0*	—	—
Govt. Areas	27 9†	28 9	29 0	28 3	28 3*	29 3
Jupiters	6 0*	—	6 0*	6 3*	6 6*	7 0
Klerksdorp Props. .	1 3*	—	1 3	—	—	—
Knight Centrals . .	10 9	10 7	10 7	11 4*	11 0	11 0†
Lace Props.	3 3*	3 3*	3 5*	3 5	3 6	4 0
Langlaagte Estates.	16 6*	—	—	—	—	—
Luipaardsveil Est. .	8 3	—	8 6†	8 6†	—	8 6†
Lydenburg Farms .	5 10	5 10	5 9*	7 1	6 9	6 6
Main Reef Wests .	6 9*	—	6 9*	6 9	6 9*	7 0†
Meyer and Charltons	—	107 6†	—	100 0*	—	106 3*
Middelvlei Estates .	1 3	1 3	1 3*	1 3	—	1 4*
Modder B.'s	117 6*	118 6*	118 0*	119 0*	—	125 0
Modder Deeps . . .	108 6	110 9	112 6	113 0	114 6	114 6
New Boksburgs . . .	1 0*	1 0*	1 0	1 3	1 0*	1 0*
New Eland Diamds.	7 0*	—	8 0*	7 0*	—	8 0*
New Era Cons. . . .	7 7*	7 7*	7 8	—	—	—
New Geduld Deeps.	2 7*	2 9*	3 1	3 3†	2 11*	3 0*
New Heriots	60 0†	60 0†	58 9†	—	—	60 0†
New Kleinfonteins . .	24 6	25 0	25 0	25 9	25 9	26 0
New Modders. . . .	302 6†	302 6†	302 6*	—	301 3*	302 6
New Rietfonteins. .	0 3*	—	0 3*	—	0 3*	—
New Unifieds. . . .	16 0*	16 0	—	—	16 0*	—
Nourse Mines . . .	—	16 6*	16 6*	16 6*	16 6*	16 6*
Pretoria Cements . .	—	46 6†	46 6†	45 0*	45 0*	45 0*
Princess Estates . .	3 6	3 0*	3 3*	—	—	—
Rand Collieries . . .	2 0*	—	2 0*	—	2 6	2 0*
Rand Klips	4 4	4 4*	4 4*	4 6*	4 6	4 6
Rand Nucleus . . .	1 4*	1 4*	1 4*	1 4	—	1 4*
Randfontein Deeps .	2 10*	3 0	3 3	3 3A	3 3*	3 5
Randfontein Estates.	12 6*	12 3*	12 6*	13 0*	14 0	—
Robinson Deeps . .	21 6*	21 6*	21 0*	21 0	21 6†	20 6*
Rooibergs	15 0	14 9*	15 0*	15 0†	14 6*	14 6*
Roodepoort Uniteds.	4 0*	4 0*	4 0*	4 0	4 0*	4 0*
Shebas	1 6*	1 6*	1 6*	1 6*	1 6*	1 6*
Simmer Deeps . . .	1 6*	1 6*	1 6*	1 6*	1 8*	1 10*
S.A. Breweries . .	32 0†	—	32 6†	32 0†	32 0†	32 0†
S.A. Lands	2 11	2 9*	2 9*	2 10	2 10*	2 10*
Springs Mines . . .	33 0	32 6*	32 9	33 0*	33 9	36 9
Sub Nigels	10 3*	11 0*	10 9*	11 0	11 6	11 3†
Swaziland Tins . . .	20 0	—	20 0*	20 0*	20 0*	—
Transvaal Coal Trust	43 6*	—	43 9*	44 3*	44 6	45 6
Transvaal Lands . .	11 6*	11 6*	12 0	—	—	12 0*
Trans. G.M. Estates	26 0*	26 3*	27 0	26 6*	26 3*	26 3*
Tudors	—	—	—	—	—	2 0†
Van Ryn Deeps . .	57 6	57 6	58 3	57 6	57 9*	58 6
Village Deeps . . .	—	—	34 0*	34 0*	34 0*	34 0*
Vogel Con. Deeps .	—	—	0 7*	0 7*	0 7*	0 8*
West Rand Cons .	—	—	—	—	—	8 3*
Western Rand Est.	—	—	1 0*	—	1 0*	—
Witbank Collieries .	42 6†	42 6†	42 6†	—	—	—
Witwatersrands . . .	—	54 0*	—	65 0*	56 0*	57 0*
Wit. Deeps	27 9	27 6*	27 6*	27 6*	27 6	27 6
Wolhuters	10 3*	10 3*	10 3*	10 3*	10 3*	10 6A
Zaaiplaates Tines. . .	11 3*	11 6	11 6*	11 6	11 0	10 9

* Buyers. † Sellers. A Odd lots.

* Buyers. † Sellers. A Odd lots.

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Commerce and Industries.

"T.C.L." Report.

The directors' interim report of the Transvaal Consolidated Land and Exploration Co., Ltd., for the period from 1st July to 30th Sept., 1915, states that there have been but few enquiries for the purchase of farm property, and the sales effected during the quarter have consisted of one farm in the Waterberg district, and a portion of a farm in the Middelburg district. Moderate sales have been effected in the company's townships, 9 lots having been sold in the township of Bellevue Central, 3 lots in the township of Fairwood and 33 lots in the coloured township of New Clare. For purchasers in Bellevue Central a system of building loans has been instituted on lines similar to those of the Braamfontein Co., Ltd. The policy of making buildings loans to purchasers of ground in the various townships has been resumed on a modified basis, and as a result a fair amount of business has been transacted. Loans amounting to £1,907 17s. 7d. have been repaid in full, and current mortgages have been reduced by £9,958 3s. 1d. New loans amounting to £5,211 5s. 5d. have been made, chiefly in respect of the building loan scheme initiated in connection with Bellevue Central township. The mortgage bonds and other advances account has also been increased by the sum of £2,291 12s. 3d., representing balances due on farm and house property sold during the quarter, transferred from property account, such balances bearing interest, being secured by the properties themselves, and being reducible by periodical instalments in terms of the respective deeds of sale.

* * * *

Beira Railway.

The report of the Beira Railway Company, Ltd., for the year ended 30th September, 1914, shows a profit of £7,419, which it is proposed to carry forward. The analysis of traffic for the year under notice shows the gross and net earnings of the Beira-Salisbury section to be as follows: Gross revenue, £498,577; expenditure, £199,238; net revenue to Beira and Mashonaland Railways, £299,338; percentage of expenditure to receipts, 39·9. This compares with the following figures for 1912-13:—Gross revenue, £635,352; expenditure, £225,096; net revenue to Beira and Mashonaland Railways, £410,355; percentage of expenditure to receipts, 35·4. The decrease in gross revenue is chiefly due to the falling off in mining machinery for Rhodesia and construction material for railway extensions in Rhodesia, which made up the increase in traffic of the preceding year. The last two months of the financial year were seriously affected by war conditions. The decrease in expenditure is £25,858, against a decrease in gross revenue of £136,775. The general goods traffic is 1913-14 was 133,505 tons, yielding £349,481, as compared with 127,464 tons, yielding £449,757, in 1912-13, this showing an increase of 6,101 tons carried for £100,276 less revenue. Construction material carried amounted in 1913-14 to 24,260 tons, yielding £35,414, and in 1912-13 to 46,553 tons, yielding £83,979. Mineral traffic for 1913-14 shows an increase, being 110,170 tons for £65,446, as compared with 88,842 tons for £50,362 in 1912-13. The traffic returns for the line from Beira to Salisbury, subject to audit, for the ten months ended 31st July, 1915, are as follows:—Gross revenue, £293,870; expenditure, £138,986; net earnings, £154,884. Gross traffics have been adversely affected by the general reduction in business caused by the war. Interest on the six per cent. income debenture stock for the year ended 30th September, 1914, was earned and was paid on 17th May.

* * * *

Fraser and Chalmers.

The directors of Fraser & Chalmers, Ltd., report for the year to June 30 that the profit, after providing for all expenses and depreciation on buildings, plant, and machinery at the Erith works, was £12,058, as compared with £8,378 for the previous year. The trading for the period has been affected by the war, and difficulties have been experienced in obtaining supplies of raw materials and in maintaining a sufficient labour force. The cost of materials and labour has considerably increased. To meet special conditions which have arisen a new and larger power station has been constructed at the works, and some additions have been made to plant and machinery. The expenditure under this head during the year has been £23,507. The business in South Africa has shown some improvement, but the volume of business in England and the other branches in the standard products of the company has been adversely affected by conditions arising out of the war. In order to compensate for the amount expended in fixed plant and machinery at the works £17,904 has been transferred from the balance at credit of profit and loss to the credit of reserve account, making the total £80,000. The dividend of 7½ per cent. on the preference shares was paid on July 24 last. The directors recommend that the balance of profits be carried forward.

* * * *

Licensee and Patentee.

By the decision of the Court of Appeal in the application by a British firm of mining machinery makers against the exclusive licensees of a German patent for an injunction to restrain threats of proceedings for infringement, it would appear that a licensee of a patent granted to an alien enemy is virtually in a position to continue issuing such threats without restraint, at any rate during the period of the war, provided that he states that he is licensee. The plaintiffs denied infringement by them of the German-owned patent or patents, but nevertheless there appears to be no power under the Patents Act to prevent the circulation of such threats. If this be the law, says the *Colliery Guardian*, as from the decision of the Court of Appeal would appear to be the case, it is nigh time that the Patents Act should be amended so as to provide means by which persons threatened can force licensees of patent rights held by aliens to justify statements that such patents are being infringed. Are there no means known to the law by which the questions of infringement and validity of a patent can be determined? We await any further development of this litigation with interest. The effect of this decision would appear to be that an alien enemy owning a British patent can, through his licensee in this country, to a great extent, if not entirely, hold up an industry in this country during the period of the war without the necessity of taking legal proceedings. Of course, a licensee, as in this particular case, may be acting purely in his own legitimate interests, but, as the law stands, it gives facilities whereby an agent of a German firm could sit on a patent and hold off all competition during the period of the war. Lord Justice Bankes seemed to think that, on the grounds of equity, the appellants had shown a good case for amendment of the law, which encourages us in the belief that something may be done to remedy this grievance.

Henderson v. Michaelson.

The case in London at the instance of Mr. J. C. H. Henderson, formerly chairman of Henderson's Transvaal Estates, Ltd., against Mr. Isidor Michaelson, claiming a declaration that an agreement purporting to sell to the defendant South African properties, debentures and shares for £45,353, was void, was heard before Mr. Justice Sargant on Tuesday, Wednesday, and Thursday of mail week, and, in the result, the action was dismissed.

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Transvaal and Delagoa Bay Investment Company, Ltd.

(INCORPORATED IN THE TRANSVAAL.)

REPORT

Submitted to the Shareholders at the Ordinary Annual General Meeting, held in the Board Room, Exploration Buildings, Johannesburg, on Tuesday, the 30th day of November, 1915, at 4 p.m.

The Directors have pleasure in submitting to the Shareholders the annexed Statement of Accounts for the year ended 31st August, 1915.

The realised Net Profit amounts to			£41,486 16 8
Balance brought forward from last year is		£128,421 19 8	
From which is deducted:			
Dividend No. 12 of 3s. 6d. per share	£32,375 0 0		
Bonus to Directors	600 0 0	32,975 0 0	95,446 19 8
Making the total to the Credit of Profit and Loss Account			£136,933 16 4

The Directors recommend that a Dividend of 3s. 6d. per share, equal to 17½ per cent., be paid. This will absorb £32,375, and leave a balance of £104,558 16s. 4d. to be carried forward.

FINANCIAL POSITION.—Cash Assets, less Sundry Creditors, amount to £113,168 13s. 9d.

The Company's holding in Shares is reduced, chiefly by the proceeds of certain Liquidation Dividends.

In view of the abnormal conditions prevailing virtually throughout the whole year under review, the Directors are of opinion that the results achieved are very satisfactory. Profits were fully maintained, notwithstanding the larger provision for depreciation, etc., and the financial position has been further strengthened.

THE TRANSVAAL AND DELAGOA BAY COLLIERIES, owned entirely by this Company, produced 555,452 tons of coal, a decrease of 31,263 tons compared with the previous year. This decrease is due to the rebellion, and to military operations in German South-West, which at times seriously interfered with the supply of Railway Trucks. There is no change to record either in the width of the seam, or the superior quality of the coal. Machinery, Plant and Railway have been maintained in the usual state of efficiency, and all buildings are in good condition. The sum of £9,019 13s. 3d. has been written off for Depreciation. Capital Expenditure, amounting to £3,071 5s. 10d., was incurred principally in the completion of the new Permanent Reservoir, the purchase of a 220 h.p. Boiler, and the erection of Sundry Buildings. By sales of second-hand machinery, etc., the net expenditure was reduced to £2,321 5s. 10d. The Permanent Reservoir, which was completed in December last, has been filled to overflowing ever since, and should continue to prove of great benefit. The annexed Manager's Report gives particulars of the year's operations. The Directors have much pleasure in expressing their appreciation of the excellent services rendered by the General Manager, Mr. James McPhee, M.Sc., M.E., and they also acknowledge the good work of the Staff and other Employees. The Company's FREEHOLD PROPERTIES IN LOURENCO MARQUES (DELAGOA BAY) remain unchanged.

TRANSVAAL FARMS.—No change has taken place during the year in the Company's holdings, which are as follows:—

Farms, Freehold, Full Interest	73,685 Acres.
Farms, Freehold, Undivided Half Interest in	101,682 Acres.
Farms—Mineral Rights only—Full Interest	6,121 Acres.
Farm—Mineral Rights only—Undivided Half Interest	8,117 Acres.
Farms, Leasehold or under Option, Full Interest	14,892 Acres.

The holdings in Johannesburg remain unchanged. All buildings have been kept in good condition.

DIRECTORATE.—In terms of the Articles of Association, all the Directors retire. They offer themselves for re-election.

AUDITORS.—The Auditors, Messrs. E. Danckwerts & Co., retire, and offer themselves for re-election.

By Order of the Board,
B. MOSES, Secretary.

The Transvaal Gold Fields Building,
Fraser Street, Johannesburg,
19th November, 1915.

Dr. Profit and Loss Account for the Year ended 31st August, 1915. Cr.

To Directors' and London Committee Fees	£204 15 0	By Realised Profit (less Union Government Tax), Rents received in Johannesburg and Delagoa Bay, Interest, etc.	£54,498 7 4
,, Salaries, Printing, Stationery, Audit, Insurance, Advertising, Legal and General Expenses in Johannesburg and London	988 13 11		
,, Salaries, Insurance and General Expenses in Delagoa Bay	478 13 5		
,, Licences, Taxes and Expenses on Farms, Claims and Landed Properties	1,631 13 5		
,, Property Maintenance, Delagoa Bay and Johannesburg	386 17 0		
,, Contributions to Governor-General's Fund and Government Hospital Ship	301 2 4		
,, Amount written off for Depreciation of Machinery, Buildings, Railway, etc.	9,019 13 3		
,, Balance carried to Balance Sheet	41,486 16 8		
	£54,498 7 4		£54,498 7 4

B. MOSES, Secretary.

S. C. BLACK,
F. DE FERRIERES, Directors.

We have audited the Balance Sheet of the Transvaal and Delagoa Bay Investment Company, Limited, dated 31st August, 1915, above set forth, and have obtained all the information and explanations we have required. In our opinion, such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given us, and as shown by the books of the Company.

Johannesburg, 18th November, 1915.

E. DANCKWERTS & CO., Auditors.

Transvaal and Delagoa Bay Investment Company, Limited.—Continued:

Balance Sheet, 31st August, 1915.

Dr.

To Share Capital Authorised and Issued—185,000 Shares of £1 each, fully paid			£185,000 0 0
,, Sundry Creditors		£10,573 6 6	
,, Unclaimed Dividends		2,085 2 4	12,658 8 10
,, Profit and Loss Account—			
Balance from last Account		128,421 19 8	
Less Dividend No. 12 to 31st August, 1914, at the rate of 3s. 6d. per Share	£32,375 0 0		
Bonus to Directors	600 0 0	32,975 0 0	
		95,446 19 8	
Add Profit for the year ended 31st August, 1915, as per Account		41,486 16 8	136,933 16 4
			£334,592 5 2

Cr.

By Property—Freehold Farm "Driefontein" (The Transvaal and Delagoa Bay Collieries), Farms—Freehold, Leasehold, Mineral Rights and under Option—in the Transvaal, Freehold Land and Buildings at Delagoa Bay, House Property in Johannesburg and Mining Claims				£119,923 9 10
,, The Transvaal and Delagoa Bay Collieries—				
Branch Railway Line to Station on Main Line.				
Amount at 1st September, 1914	£10,000 0 0			
Less Depreciation	1,000 0 0	9,000 0 0		
Permanent Works, Shafts, Plant, Machinery, Water Service, Pumping Stations, Locomotives, Assay Plant, Buildings, Tools and Implements—				
Amount at 1st September, 1914	£69,623 6 10			
Less Depreciation	7,620 5 2			
	£62,003 1 8			
Additions during the year (less Sales)	2,242 19 4	64,246 1 0		
Livestock, Carts & Harness, Motor Car and Furniture—				
Amount at 1st September, 1914	£959 14 6			
Less Depreciation	287 18 4			
	£671 16 2			
Additions during the Year (less Sales)	78 6 6	750 2 8		
Stores, Bags and Stock of Coal		5,983 6 0		79,979 9 8
,, Furniture, Farming and other Stock (less Depreciation) and Amounts paid in Advance (less amounts received in advance)				1,925 12 0
,, Sundry Shares—				
Witwatersrand Native Labour Association, Ltd.—				
219 £1 Shares, 12s. paid, 25s. per Share Deposit		405 3 0		
Other Shares at or under Cost		12,514 14 1		12,919 17 1
,, Sundry Investments—				
Sundry Debentures, at or under Cost		12,095 2 9		
£2,500 4½ per cent. War Loan, 1925-1945		2,450 0 0		14,545 2 9
,, Sundry Debtors				17,321 6 1
,, Cash at Bankers		36,977 7 9		
,, British Treasury Bills, due December, 1915		37,000 0 0		
,, Loan against Securities		14,000 0 0		87,977 7 9
				£334,592 5 2

Witbank Colliery, Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Fifteenth Ordinary General Meeting of Shareholders in the above-mentioned Company, will be held in the Company's Board Room, Cullinan Building, Johannesburg, on **Friday, 28th January, 1916, at 12 noon.**

BUSINESS:

1. To receive the Report of the Directors and the Financial Statements to the 31st August, 1915.
2. To elect three Directors in the place of Messrs. E. A. Wallers, A. G. Gill and W. H. Dawe, who retire, in terms of the Company's Articles of Association, but, being eligible, offer themselves for re-election.
3. To appoint Auditors for the ensuing year, and to fix the remuneration for the past audit.
4. To transact any other business which may be transacted at an Ordinary General Meeting, or which is brought under the consideration of the Meeting by the Report of the Directors.

AND Notice is hereby also given that at the same place and on the same day, at 12 o'clock noon, or so soon afterwards as the Ordinary General Meeting shall be concluded, a **Special General Meeting of the Witbank Colliery, Limited,** will be held for the purpose of considering, and, if thought fit, of passing an Extraordinary Resolution authorising the extension of the objects of the Company by taking power to carry on the business of producers and suppliers of electricity for the purposes of light, heat, motive power or otherwise and for generating, accumulating, distributing and supplying electricity to places both public and private, and for constructing, laying down, establishing and erecting all necessary stations, cables, wires, lines, accumulators, lamps and works.

AND Notice is hereby further given that a further **Special General Meeting** of the Company will be held at Cullinan Building, Johannesburg, **on Saturday, the 19th day of February, 1916, at 12 o'clock noon,** for the purpose of receiving a report of the proceedings at the above first-mentioned Special General Meeting, and of confirming, if thought fit, as a Special Resolution, the above-mentioned Extraordinary Resolution.

The London Transfer Registers of the Company will be closed from the 30th December, 1915, to the 9th January, 1916, both days inclusive, and the Head Office Transfer Registers of the Company will be closed from the 25th January, 1916, to the 11th February, 1916, both days inclusive.

By Order of the Board,
H. G. L. PANCHAUD, Secretary.
Johannesburg, 25th November, 1915
22775

Electrical Notes.

PRACTICAL POINTS IN CONNECTION WITH THE USE OF ELECTRICITY IN MINES.*

THE rapid growth in the use of electricity in mines during recent years makes it necessary for mine officials, especially the managers, to have a degree of electrical knowledge at least sufficient to enable them to know when a thing is right or wrong. All will agree that it is better to anticipate a breakdown than to repair it, and to do this it is necessary to know where trouble is likely to occur. Electricity, like many other things, is dangerous when in the hands of incompetents, but if the right class of plant is installed and properly maintained, the transmission of large powers over long distances can be accompanied with a minimum of obstruction in roadways, etc. Another very important point is that the efficiency is maintained throughout the life of the plant. For instance, immeditaley a cable breaks down it has to be properly repaired, as it will not allow of leaky joints. Broadly speaking, in electrical plant, all defects must be at once repaired, but with other kinds of power, leakages can, and in many places do, continue indefinitely. Incidentally, it would surprise many managers to know the cost of such leakages over a period of twelve months. A few brief hints on some of the essential features of suitable electrical plant may be of interest.

SWITCHGEAR.—All types of switchgear should be chosen with due regard to the class of work they may have to do, preference being given to the oil-immersed type. Selection should not be governed by price, and if the requirements are stated to manufacturers of repute in this country who have spent a great deal of time and money on perfecting this class of apparatus, a satisfactory result is assured. The chief points to consider are:—(1) Strength, combined with reasonable weight and size; (2) simplicity, accessibility, and speed of make and break—the more rapid, the better; (3) liberality in design of current-carrying parts and insulation, and (4) absence of all suspicion of open sparking or risk of accidental shock during examination or repair. A further point is that underground switchgear should be of the floor-mounting rather than of the wall-mounting types, as in the latter case the walls are apt to "squeeze" and break the switch frames.

MOTORS.—These should be chosen with an ample margin for overload, and with careful regard to the class of work they have to do, the position in which they will have to be installed, and the length of time they will be required to work continuously, also the size of the air gap between the rotor and stator. The margin of overload should be at least 25 per cent. for three or four hours, i.e., above the actual horse-power required. The class of work is of some importance; for instance, a squirrel-cage motor, although the hardiest and least susceptible to sparking, will not start up under a heavy load such as a large fan or haulage gear. In such cases friction clutches are usually fitted. Slip-ring and continuous-current motors, however, will start up under very heavy loads. It is a good plan where motors up to, say, 30 or 40 h.p. are working in a damp or dusty atmosphere to have them totally enclosed, as that preserves the insulation of the windings. With larger motors than this, special arrangements have to be made, because a totally-enclosed motor will only develop about half its horse-power, the output being limited by the temperature rise. A considerable saving in the initial and running cost of a motor can be effected in cases where motors start and stop frequently, as with direct haulages, etc. For instance, if a motor works for, say, 10 minutes, and then stops for 10 minutes, the motor then has a load factor of one-half, and if it is required to develop, say, 30 h.p., then a 15 to 18 h.p. motor will sustain the load without abnormal heating. The question of the air gap is important. Alternating-current motors have a very small clearance between the rotor and stator, and the danger, of course, is that the bearings will wear and allow the rotor to foul the stator, thereby causing a burn-out of the windings. For mining work, it is advisable to choose a motor with a large air gap and sacrifice to some extent the efficiency. Some makers have adopted an adjustable bearing which adds to the reliability of the motor and the life of the bearings.

CABLES.—The most suitable type of cable for mining work is the bitumen-insulated, as water has little or no effect upon it. A point to guard against however, is heating of the insulation by steam or hot-water pipes, etc. Apart from this, little can go wrong with such a cable beyond overloading and mechanical damage; even then, if the armouring is well earthed and the overload trips or fuses properly adjusted, it is perfectly safe from the point of view of shock or fire.

POWER DISTRIBUTION.—Three-phase current has many advantages over direct current in mining work owing to is ease of transformation to different voltages, its capacity for long-distance transmission at high potential with a minimum of loss due to resistance, and the saving of copper than can be effected. A.C. motors also are less liable to breakdown or sparking, and all commutator troubles are eliminated. Where power has to be taken a long distance in-bye, or where it is required to supply a colliery a few miles from the generating station, a good system is to transmit at about 3,000 to 6,000 volts and transform down at the far end to a medium or low pressure for motors and lighting. It is also good practice in a number of cases to use high-voltage motors of 50 h.p. and upwards, thereby doing away with transformer losses. The use of high voltage is quite as safe as low voltage, if only for the reason that it commands more respect, and therefore more care and attention is given to it.

EARTHING.—The earthing system, and the method of testing it, is in many respects the most important part of an installation. The true function of the earthing circuit is to discharge into the general mass of earth any leakage of current that may occur, without allowing the voltage to rise to a dangerous amount before the overload releases or fuses come into operation, as there is always a time element with these devices before they can effectively cut off the current. The best way to accomplish this is to secure a suitable place on the surface to bury a main earth-plate. The ground should be of a damp, clayey nature. Main water pipes make good earths, and plates buried in ponds are usually very efficient. Two earth-plates, about 4ft. square, connected together at about 20 to 30 yards apart, are much more effective than one plate twice the size. Subsidiary earth-plates can be installed underground in the sump or water lodges, and go a long way to assist the main earth-plates. It is further necessary to earth all electrical apparatus working with a voltage exceeding that of low pressure, and the resistance of the earth circuit must not be more than 50 per cent. of the conductor supplying the apparatus. The earth circuit for this is usually the armouring of the cable, which can be made to this standard, but there are cases where a high-voltage cable of small size may have to carry a heavy current from the low-tension side of a transformer, and probably the armouring of the high-tension cable would not be large enough to carry that current safely; it then becomes necessary to run a separate earth-wire to assist the armouring. In cases such as these, it is advisable to bond the wire to the cable every 50 or 100 yards, and so increase the effectiveness of both. It is also a good plan where several earth-wires terminate, say at a distribution centre, to connect all the ends to a common earth-bar; it is then a simple matter to examine all the joints. A very important point is not to rely upon the cast iron of the switch cases and joint boxes to form part of the circuit, as cast iron has a very high resistance. In all such cases the switches, etc., should be bonded. In addition to this, it is advisable to have two distinct earth connections to all apparatus, so that if one works loose there is always a safeguard. A good way to ensure against loose connections is to use lockwashers on all joints; this also applies to the live conductors. The best way to test an earth circuit is as follows:—Disconnect both plates from each other and with a low-reading ammeter and voltmeter, and about three or four dry cells, see how much current can be sent from one plate to the other through the earth, with a certain voltage. The Board of Trade standard for this is that a pressure of four volts shall suffice to pass a current of two ampers from one plate to another, through the earth. In this case the resistance works out to 2 ohms. Under these conditions one can feel quite content about the main earth-plates. To test the underground circuits, the same drop-in-volts method can be applied by switching off the current at the surface, disconnecting the main cable and connecting all cores together and the same at the other end of the cable; then, at the far end, connect the cores to the armouring, and from the surface send a current of from 2 to 5 ampers through and see what voltage is required; then by applying Ohm's well-known law, the resistance is obtained. An example of this can be given thus:—

Assuming a cable is 2,000 yards long from the surface to the far end, and it is found that three volts will send 5 amperes through it, i.e., down the cores and back along the armouring or earth-wire, then—

$$\frac{\text{Volts}}{\text{Amps.}} = \text{Resistance} = \frac{3}{5} = 0.6 \text{ Ohm.}$$

If the overload trips or fuses are set to operate at, say, 100 amps., then—

$$\text{Current} \times \text{Resistance} = \text{Volts} = 100 \times 0.6 = 60 \text{ Volts.}$$

It therefore follows that 60 volts only will send 100 amps. through the circuit to earth, which is sufficient to cut off the supply. Such a circuit then has a good margin of safety.

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* Read, October 9th, before the Lancashire Branch of the National Association of Colliery Managers.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

Engineering Notes and News.

Electric Power for Farms.

The application of electric powei to farm work grows steadily, more especially in view of the great hydro-electric plants that are being developed in districts remote from present manufacturing activities, where the power must be transmitted great distances. Where some of this power may be utilised locally it is of advantage both to the producer and the user, as it enables a higher continuous steady load to be carried on the generators, and this in turn enables the power to be sold at a lower rate, as more power may be produced without increasing the overload charges. One very practical application of electricity in some districts would be in the running of irrigation pumps. This could be done economically if enough power were taken to pay for the installation of the service lines. Every farm has a considerable amount of machinery that might be operated advantageously and economically with a reasonably priced electric current, and introducing the power initially for the running of irrigation pumps would lead naturally to the application of the electric current to other purposes. In view of the vast field waiting to be utilised it would appear to be the part of wisdom to see that irrigating plants, frequently developing a great amount of power, were designed to develop electric current and to distribute it throughout the various tracts of irrigated land. This could be done readily where a steady load may be maintained, in which case the current might be furnished cheaply by the power station. Where an irrigating plant is designed to furnish water only and at the same time is capable of developing considerable power, it is an economical waste not to utilise the latter opportunity. It should be borne in mind that cheap power on the farm would not only be of tremendous benefit to the farmers so served, but would add materially to the advantage of the country at large; for by making the farm more readily productive a considerable addition is made to the total wealth of the nation. The supplying of cheap power to the farm would appear to be an alluring and most promising field for the electrical engineer.

Making Clear Specifications.

Most of us who have had anything to do with plans and specifications doubtless have come to the justifiable conclusion that "specifications" is a synonym for trouble. Rare indeed is it to find a set of specifications so clearly and so simply written that any dispute over them may be settled quickly simply by reading them over carefully. The subject of good specifications is a live one, and we cannot go far out of the right way in reprinting what "Power" has to say on the subject editorially:—"A specification or written contract should be a binding agreement that will hold good in law, and should also define or describe so clearly that no doubts can arise, when examined in detail, as to the meaning, scope and intention of the agreement. Simple, direct, and comprehensive language alone will fulfil these needs. No matter how complex the idea, some way of expressing the meaning will be clear to all parties is always to be found. Yet it is the rule, rather than the exception, on contract jobs for owners, engineers, inspectors, contractors and mechanics to be hindered one or more times by a dispute over the interpretation of some clause of the specification. At such times it seems as if the ideal contract will never be written. Each of the interested parties is able to show good reasons for his contradictory interpretation of the meaning. The owner justifies his effort to get the best class of service and material for the least possible expenditure, and the contractor, on his side, strives to make the contract call for the least material and labour. These opposing interests of owner and contractor are the reason for the binding character of the agreement, and the frequent ambiguity of meaning may in many cases be traced to over-anxiety on the part of the writer to produce a document binding in law. At the same time these opposing interests call no less for clear unambiguous specifications than for legal safeguard for the protection and control of both parties. Probably the best way to obtain such specifications is to have them written by some disinterested third party who is thoroughly familiar with the work to be done, the legal demands, and the necessity for perfect clearness. Another method of obtaining clear specifications and one which has been receiving considerable attention is the use of a uniform standard specification. Where applicable, this method appears to be best, the standard form being adapted from time to time to agree with an ever-widening experience."

Some Lessons of the War for Engineers.

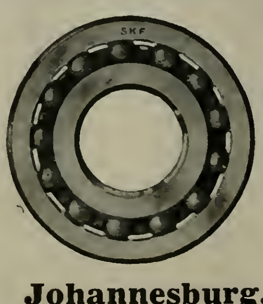
At a recent meeting of the Derby Society of Engineers, a paper was read by Mr. J. Ferguson Bell, M. Inst.C.E., M.Inst. Mech.E., the chairman, on "Some Lessons of the War for Engineers." In the course of his remarks the author said: In his opinion the apprenticeship system should be extended to all trades and carry with it the obligation of a thorough practical training, and, on the part of the apprentice, a certain standard of proficiency to be attained. If one result of the war was to cause us to realise that a higher standard of proficiency and dexterity was demanded, that if we were to continue holding our own as a manufacturing nation, all such barriers as trade restrictions upon output must be abolished once and for all, and machines and processes worked to their fullest capacity, then a much-needed lesson would have been taught. In consequence of the specialisation at most works, industrial apprentices were often unable to obtain in the workshops an efficient, all-round instruction in their trade; hence the necessity of industrial or trade schools as an aid to practical training. With reference to the economic effects of the war, the author contended that we must aim at becoming more and more a nation of producers rather than of middlemen depending upon others for manufactures. To that end new industries should be developed, and certain existing ones assisted, perhaps for a time by protective tariffs, or preferential trading between the Allies. The recent import duty of 33⅓ per cent. on motor cars was indispensable to the preservation of this home industry, and he regretted similar protection was not extended to many other home industries. After touching upon the paramount importance of better methods of enonomising and consuming the national coal resources, Mr. Bell urged that a higher degree of efficiency must be attained in all industrial operations. In many instances, it was well known that we actually exported crude products and raw materials, for producing the finished article which was sent into this country.

Nikola Tesla on the Future of Electricity.

The well-known inventor, Nikola Tesla, has contributed to the *Manufacturers Record* his anticipations of the far-reaching applications of electric power. He states that with "new, efficient, extremely cheap and simple thermodynamic transformers" not less than 4,000,000 h.p. could be developed in electric generators by utilising the heat of blast furnace and coke oven gases. He expects confidently the practical realisation of this project in the very near future, and looks to exceptionally rapid electrical development in this direction. "But the time is very near," he adds, "when we shall have the precipitation of the moisture of the atmosphere under complete control, and then it will be possible to draw unlimited quantities of water from the oceans, develop any desired amount of energy, and completely transform the globe by irrigation and intensive farming." The present limitations in the transmission of power to distance will be overcome in two ways—through the adoption of underground conductors insulated by power, and through the introduction of the wireless art. The inventor has many wonders in view, but of the three main sources of life-sustaining energy—fuel, water power, and the heat of the sun's rays—he considers the second to be by far the most valuable resource, and on this, he thinks, humanity must build its hopes for the future.

"SKEFKO"

BALL BEARINGS.



'Phone 835. Johannesburg. Box 654.

The Week's Meetings.

CONSOLIDATED MAIN REEF.

IMPROVED POSITION.

LARGE ORE RESERVES.

The annual meeting of the Consolidated Main Reef Mines and Estates, Ltd., was held in the boardroom at Cullinan Buildings on November 26. Mr. W. H. Dawe presided, and the others present were Messrs. A. A. Auret, J. H. Ryan, P. Dreyfus, J. Jourdan, R. Goldman, W. P. Fisher, S. H. Webb, M. Honnet, W. H. B. Frank, F. R. Lynch, and the secretary, Mr. H. G. L. Panchaud. The share representation was 228,757 out of 924,364 issued.

The Chairman, moving the adoption of the report and accounts, said:—The directors' report and financial statement for the year ended the 30th of June, 1915, together with the reports of the consulting engineer and the general manager, have been in your hands for some time, and I feel sure that the information contained therein will have given you satisfaction. Compared with the previous year, the total working profit earned, at the figure of £138,265, shows an increase of £21,656. The credit balance of £65,423 brought forward from the previous year was increased to £69,874 at the close of the last year. Capital expenditure amounted to £33,497, of which over £31,000 was incurred in connection with shaft sinking and machinery and plant. Of this sum, £9,470 was written off against the year's profit, and the balance provided for out of the funds derived from the amalgamation scheme of 1909, the cash still available from this source at the 30th of June last being £16,379. Two dividends were declared during the past year, of 6¼ per cent. each, giving a total of 12½ per cent., as compared with 10 per cent. declared for the year ended the 30th of June, 1914.

Ore Reserves.

In regard to the mining and milling operations, the fullest information is given in the reports of the consulting engineer and the general manager, and it only remains for me to refer to a few of the more prominent features. It is most gratifying to note that the ore reserves, on the 30th of June last amounted to 855,600 tons, of an average value of 7.53 dwts. over 48.5 inches, showing an increase of 162,140 tons, and an increase of .19 dwt. per ton in the value; and that during the year 382,620 tons, of an average value of 7.85 dwts. over the stoping width, were developed. A total development footage of 18,882 feet was accomplished, and your consulting engineer points out that the driving done on reef and in the country was 11,105 feet, which is an exceedingly high footage for a mine which milled a little less than 25,000 tons per month. The figures show an increase in the tonnage milled and in the total yield. The value of the yield per ton milled was 1s. 5.5d. less than the figure for the previous year; but, on the other hand, the costs per ton milled were 1s. 2d. less, and therefore there was a difference of only 3.5d. in the profit per ton milled. Regarding the yield per ton milled, I would point out that a percentage of the ore milled was obtained from development rock and outside sources, and a considerable tonnage was obtained from the east and central shafts, which rock is not included in the ore reserves. It, however, yields a small profit, and enables a larger tonnage to be milled, thus reducing the working costs. Further, it would be unwise to abandon this ore until all that will yield a profit has been extracted. In the western section there are many blocks which are developed and are in a suitable position for being mined and trammed cheaply, and as hoisting from this western shaft must ultimately cease, it is necessary to mine this lower-grade ore now, or otherwise it might not be mined at all. I mention these facts for the purpose of making it clear to you that although the value of the ore reserves might lead you to conclude that the yield might have been higher than it was, there are sound reasons why a higher figure was not obtained.

Native Labour.

During the year which ended the 30th of June, 1914, our native labour supply fluctuated a great deal, but the past year showed a very considerable improvement in this respect, the average number of natives employed being 1,675, as compared with 1,422 during the previous year. The effect of the improved position in regard to native labour was the considerable increase in the tonnage milled and a decrease in the costs, whilst the percentage of rock broken by machines was decreased from 60.6 per cent. to 58.6 per cent. The increased development footage was accomplished almost entirely in the vertical shaft section of the mine, where the total footage done was 9,112 feet, an increase of 5,466 feet, and almost the whole of the driving was done on the main reef leader. In the few places where the south reef was exposed in this section it gave disappointing results. Of the 4,403 feet driven on the main reef leader in the west drives, 4,200 feet were sampled, and gave an average value of 8.2 dwt. over a stoping width of 48 inches. On the other hand, the values exposed on the main reef leader in the east drives were disappointing, as the reef was much more broken by dykes and faults, and consequently out of 2,044 feet of driving, only 1,325 feet were sampled, and of this 465 feet gave an average value of 9.7 dwt. over 48 inches, whilst the balance gave unpayable values. As you are aware, this is no new feature, as the development of the eastern section of the mine has for a long time past given very unequal results. In regard to the work which has been done since the close of the financial year, I need only mention that the position has been satisfactorily maintained. For the quarter ended September 30, 83.4 per cent. of the footage driven on reef was payable, having an average value of 9.6 dwt. over 48 inches, whilst the tonnage exposed amounted to 68,840 tons. The profit for October amounted to £13,934, which is the highest monthly profit since October, 1912.

Future Development.

I should like to add a few words in regard to the work in connection with the future development which it is hoped to carry out by June 30, 1917. This will include the cutting of new engine chambers for the incline shafts at the vertical shaft and at the west shaft, and the equipment of these inclines. The estimates include the sinking of the incline at the vertical shaft for 1,000 feet and at the west incline for 250 feet, and your consulting engineer considers that with the completion of this work the mine will be in an excellent condition for the sinking of the two inclines and the rapid development of the lower levels. There are also certain items of surface equipment, the unexpended balances in connection with which amount to £9,654. The work in connection with the west or No. 2 shaft will cost £10,519, and that in connection with the vertical or No. 3 shaft £46,829; the total estimated capital expenditure to June 30, 1917, will be £93,986, and towards this we have, as I have already mentioned, an amount of £16,379 unexpended capital. In connection with this expenditure there are several points to be borne in mind. The first is the possibility that all the work outlined will not be completed within the period mentioned. But, assuming that the amount will be expended, we estimate that we can, with a monthly profit of from £13,500 to £14,000, meet this expenditure and maintain the rate of dividend paid during the past financial year. We have reason to expect that the good labour supply will be maintained, and consequently that this rate of profit will continue. The point I wish to emphasise is that this work can be carried out without making any abnormal effort or departing from the policy in connection with the grade of ore which is being milled, to which I have already referred. I have been a director of this company for a good many years, and have seen it through some rather trying times, and therefore you will readily understand how extremely satisfactory it is for me to be able to deal with a position as strong, both financially and from a mining point of view, as that in which your company is to-day. The result of the policy which is being followed, and which perhaps is on the conservative side, will be that we shall maintain a good position in regard to the ore reserves, until such time as the development of the lower levels enables us to form an opinion regarding the value of the ground which will then be opened up. If the present good values continue into the lower ground, the future will be exceedingly promising; if, on the other hand, the values be disappointing, the position which we have built up would enable us to weather an unsatisfactory period with comparative ease.

The War.

I must also add a few words in connection with the circumstances which have arisen out of the war. The mining industry has been especially favoured in being able to continue its work on practically normal lines. Necessarily, the additional taxation and the higher prices which have to be paid for stores, have had an effect upon the working costs; but fortunately this has been offset to a certain extent by the fact that we have a more adequate native labour supply than we have had for many years, the result of which is that it has been possible to deal with a larger tonnage. I am sure you will confirm the action of your directors in contributing to the funds which have been started in connection with the forces which are being raised in the Union for the purpose of bearing our share of the Empire's burden in this great war; also that you will approve of the Board's action in making adequate allowances to those of the company's employes who have volunteered for active service, with the permission of the management. A large measure of praise is due to the employes of the mining companies for the readiness they have displayed, and are displaying, in helping the cause of the Empire and its Allies. This readiness is shown by the willingness to render active service, by generous contributions to the war funds, and last, but not least, the action of those who are continuing their ordinary work when their inclination would lead them to volunteer for active service, but where permission could not be granted, as their services are necessary to the industry. On behalf of your directors, I must express appreciation of the services rendered by your consulting engineer, Mr. J. E. Healey. I now beg to move the adoption of the reports and accounts, as submitted.

Chairman Congratulated.

Mr. J. H. Ryan, seconding, said: I am sure it must have been very pleasing to shareholders to listen to the speech just delivered by you. It discloses a splendid and much-improved position for the company, and I congratulate you, sir, on being able to show us such good results. You have occupied the position of chairman for some years, and I know that during your periods of office you have had many troubles to contend with; it must therefore be all the more gratifying to you to see the company now on a fair course towards prosperity. I note the reason given by you for the recovery value during the last 12 months being rather below the average of the ore reserves, and quite agree that it was good policy on the part of the management to mill the low grade, payable ore, which if left till later might have been lost entirely. The year's work shows briefly that you have been able to increase our dividend from 10 per cent. to 12½ per cent., you have supplied out of profits between £9,000 and £10,000 for capital expenditure, and you have given us an increase in reserves of 162,000 tons with a slight increase in value. This is a very creditable result, and, combined with the promising developments in the lower levels, I think fully justifies the directors in the capital expenditure programme indicated in your forecast. I am more than pleased, Mr. Chairman, that you have referred so fully to the work of the employes during the last 12 months; these men have, I consider, shown up splendidly—they have been zealous in their work for the company, they have contributed handsomely to the war funds, and have volunteered for active service in large numbers. As you say, sir, many more would have gone forward, but they could not be spared, and on it being pointed out by high authority that the industry had to be kept going, they have continued their ordinary vocations, although they would have preferred being in the fighting line.

The report and accounts were adopted unanimously, and the retiring directors were re-elected.

MAIN REEF WEST.

BETTER LABOUR SUPPLY.

REDUCED VALUES.

Mr. W. H. Dawe presided at the annual meeting on Nov. 26 of shareholders of the Main Reef West, Ltd., and the others present were Messrs. P. Dreyfus, M. Honnet, W. P. Fisher, R. Goldman, C. H. Mullins, W. H. B. Frank, E. Richardson, and Mr. Panchaud, secretary. The share representation was 226,957 out of 491,188.

Moving the adoption of the reports and accounts, the Chairman said: After perusal of the reports of the consulting engineer and general manager, which accompanied the report of the directors and the financial statements for the year which ended on the 30th June last, you will probably have been struck with the effect on the operations of your company of the adequate supply of native labour. The average number of natives employed during last year was 519 higher than for the previous year, with the result that the tonnage milled was increased by 56,548 tons. A further effect was evinced in the working costs, which, on account of the larger tonnage, showed a reduction of 3s. 3.25d. per ton milled; and this reduction to some extent off-set the lower value or the yield, with the result that the total profit was only £5,765 less than that of the previous year. The total footage of development work was 13.502 feet, and the reef exposed by this development footage amounted to 115,710 tons, of an average value of 5.75 dwts. over a stoping width of 48 inches. The ore reserves show a decrease of 110,160 tons, and, on the 30th June last stood at 416,280 tons, of an average assay value of 5.87 dwts. over 51 inches, which value is a slight increase on that of the previous year.

Go-Ahead Policy.

The details of the work done on the various levels, with the results obtained, are given in the reports, and it does not seem necessary for me to recapitulate that information. I think, however, that the following table will be of interest to you:

Quarter ending.	Tons exposed.	Total footage on reef.	Payable footage.	Percentage of payable footage.	Aver. value payable footage over stoping width.
1914.					
Sept. . . .	17,040	2,018	957	47.4	7.2
Dec. . . .	24.490	2,589	1,124	43.5	7.3
1915.					
Mar. . . .	23,750	2.489	1.513	60.8	7.7
June . . .	28,880	2.441	1.274	52.2	7.7
Sep. . . .	53,130	2.540	1.267	49.9	6.7

These figures clearly summarise the results obtained, and although I realise to the full extent the many disappointments we have met with, and the anxious times that we are going through, the figures I have given you appear to justify the belief that the policy of steadily driving ahead, and opening up the property in depth as quickly as possible, should ultimately meet with its reward.

Further Sinking.

You will notice that your consulting engineer states that a considerable amount of capital will have to be expended during the next two years, in connection with work for the east and west subsidiary incline shafts. The east shaft will be sunk to the 15th level, and at this point it will have a depth of 4,390 feet from the surface, and as this is the greatest depth from which hoisting can be done, with the present engines, from this shaft, it will be necessary to sink a subsidiary incline from this level, in order to open up the deeper levels of this section of the mine. In the western section, the total depth of the 15th level from the surface is 3,200 feet, and from this level it is intended to sink a subsidiary incline, from near the end of the 15th crosscut. The sinking of these two inclines as rapidly as possible is of paramount importance, and every endeavour is being made to push this work on as rapidly as possible. Naturally, with the necessity of undertaking this work your board had to consider the question of finance, and it was estimated that the expenditure involved could be met if the debenture-holders agreed to the postponement of the redemption of debentures for three years—that is, 1915, 1916, and 1917. With this object in view, the trustees for the debenture-holders were approached, and I am pleased to be able to inform you that at a meeting of the debenture-holders, held in London on the 29th September last, it was unanimously agreed to accede to the proposal of your board. The arrangement to postpone the redemption of the debentures does not interfere in any way with the half-yearly payment of interest on the same.

Area Explored.

I have already given you the results of development up to the 30th September, and there is practically nothing to be added to that information, as during the month of October development was on practically the same lines. It will probably be interesting to you to know that the number of claims explored, up to June, 1915, was 155, out of a total of 549.6, or 28.2 per cent of the total claim area,. leaving 394 claims to be exploited. I mention this because one is sometimes inclined to overlook the fact that the property is a large one. In regard to the financial statements, you will notice that the amount expended on capital account was £8,201, and of this, £7,734 was on account of shaft-sinking and machinery and plant. You will also notice that in the appropriation account provision was made for the redemption of debentures to the amount of £25,000 for the year 1915, as the accounts are to the 30th June, whereas the meeting of the debenture-holders at which they agreed to postpone the redemption was not held until September: therefore, the sum of £18,750, representing the provision for redemption for the period 1st October, 1914, to 30th June, 1915, will revert to the credit of the cash available. The credit balance brought forward from the previous financial year amounted to £23,414, and, at the close of the financial year stood at £24,710. The only other question to which I wish to refer is the assistance which has been given to those of the company's employees who, with the permission of the management, volunteered for active service. I am sure you will confirm the action of your directors in accepting a responsibility which no one could desire to avoid. On behalf of your directors I wish to express their appreciation of the services rendered by the consulting engineer and the general manager, who have worked most strenuously in the company's interests. I now beg to formally move the adoption of the reports and accounts, as submitted.

Mr. Goldman seconded, and the meeting adopted the report and accounts. The whole of the directors were re-elected.

LACE PROPS.

FUTURE OF THE FAR EAST.

MR. DALE LACE'S REVIEW.

The annual meeting of the shareholders of the Lace Proprietary Mines, Ltd., was held on November 26. Mr. J. Dale Lace, chairman of the company, presided, and among those present and represented by proxy were:—Messrs.

Alfred Barker, W. P. Collins, John Forrest, E. M. Hind, E. H. Lamb, Julius Jeppe, A. P. Lloyd, J. L. McConnell, O. Mason, W. Nelson, D. O'Regan, J. S. Richardson, John Hall Ryan, Bailey Southwell, W. Taberner, H. N. Wheeldon, J. T. Williams, Alex Wylie, W. P. Fisher, B. Owen Jones, L. Edwards and O. F. Brotherton, secretary, representing 93,550 shares out of a total issued capital of 250,480 shares.

The Chairman, in moving the adoption of the report and accounts, said:—There is no special change to which I need to draw your attention. The rentals which we draw from the two farms are, as you will perceive, more than sufficient to defray all the expenses of the company. Before putting the formal proposal of adoption of the report and accounts, I think it will be in our mutual interests if I invite you to a short retrospect of the company's affairs, and at the same time impress upon you both for the advantage of our older shareholders and others who may have acquired their holdings later, the valuable nature of your landed property assets. You own the freehold farms Vlakfontein, No. 26, extent 3,554 morgen; Droogefontein, No. 447, extent 5,419 morgen; being equivalent to 18,991 English acres. The whole of Vlakfontein, and a considerable proportion of Droogefontein, have been proved by our own work and that of our neighbours to contain the Reefs of the Far Eastern Rand. In the company's annual report for the year ended the 31st of August, 1909, our consulting engineer, Mr. S. C. Thomson, gave the results of a borehole which had been completed by us on Vlakfontein. The main reef was encountered at a depth of 4,813 feet. The reef section gave a net width, after correction for deflection, of 5 feet. The values on assay were unpayable. And in this regard I may remind you that we also had rather low values in the boreholes we had previously put down on Droogefontein.

But, and this is a very large "but," gentlemen, which I wish you to note carefully, borehole assays are notoriously unreliable. It is a fact based on general and actual experience that bad borehole assays do not connote unpayable reef. I will quote the consulting engineer's remarks when referring to the Vlakfontein borehole in his report of 1909 already mentioned. "While the values obtained from the core are low, it is well known that this has been the experience in other holes, where subsequent shaft sinking and development have exposed distinctly payable reef." In saying this, Mr. Thomson was speaking of what he knew at that time. Since then, results of mines working to-day and yielding splendid returns bear out to a largely amplified degree the correctness of Mr. Thomson's statement. I will refer you, among others to Modder B. and Brakpan as cases in point. In these the borehole assays were distinctly unpayable. I might quote you many others. Yet you know what satisfactory results have followed in each instance. Again, I may point out to you that the position of Vlakfontein is such as to render it highly improbable that the reef matter it contains should be other than payable. The mines in your immediate neighbourhood include New Modderfontein, Modder B., Van Ryn Deep, Modder Deep, State Mines, Brakpan, Geduld, Springs Mines and Daggafontein. But we have something better to go upon than conjecture. I will remind you that, being unconvinced that the poor assay results of our Vlakfontein borehole were a true indication of values, your board some 12 months later had a second cut made from the borehole which bisected the reef at a distance of probably 60 feet from the former point of attack. The assay results in this case gave, over actual core lengths, 13.2dwt. over 13½in. for the main reef leader, and on the main reef section, measuring 78in. wide, a stoping width of 25½in. being the upper portion, gave a return of 4.73dwt. The area of Vlakfontein equals 5,117 claims. In regard to the depth at which the reef may be looked for, we have an opinion from the consulting engineer based on our own borehole results and data gathered from neighbouring workings, that in the western portion of Vlakfontein we should not have to sink more than 3,400 feet to encounter the main reef. (That was Mr. Thomson's opinion.) That cannot be registered as a very deep level, for many mines are to-day working at a considerably greater depth. It is obvious that in Vlakfontein you have a highly payable property, and one of my objects in recapitulating as I have done the details which have been communicated to you in previous reports is to caution proprietors against parting with their shares at a market price which by no means reflects their real value.

The Far East.

The problem we have before us is how to get at the gold contents of your property. When in 1909 I predicted to you the prosperous future awaiting the Far Eastern Rand, I was assailed with many objections. In those days any argument was good enough to keep back any and every development eastwards. Where, I was asked, was the native labour to come from to work this vast new area? I replied that I was content to leave that in the hands of the United Parliament of South African States, whose statesmen, if they could bring about Union, could find us the requisite labour to carry on this great and essentially necessary industry. And what is the position now? Not only the eastern mines, but all the other mines have to-day a plethora of labour. This is not because the diamond mines are not working. That does not account for it. You can for yourselves very soon total up what natives the diamond mines require. If you want my opinion it is this, particularly: The natives are increasing enormously; they are gradually being civilised and are learning the dignity of labour. So much so that should the white man not begin to see the danger of it, the native is likely to supersede him, learning as he is doing the dignity the white man is losing. And again, it is to be remembered that of many of the older mines, some are closed down, others are working on smaller scales, making available for new enterprise much or all of the labour they formerly employed. It was also said by some, including almost the first authority, "a decade hence will be time enough to talk of your Far East Rand. You cannot get the money for its development." But what is the position to-day; what has happened in the past seven years? Everyone rushing to acquire eastern investments. Why? Because the gold is wanted and must be had, and if the Government are going to accede to the demands that have been made on them from time to time to grant terms for the opening-up of the vast auriferous areas of the Far East Rand, I can foresee a time of prosperity for all, far greater than any we have yet seen, because the Eastern Rand has developed and is developing far and away richer than ever was thought by the plucky pioneers of that great district. The terms to be granted must be such as to be attractive to capital and at the same time fair and reasonable to owners of property acquired at enormous cost and proved by those owners without Government aid, and also fair to the people and the Government itself.

The Older Mines.

I notice recently that mines which formerly claimed to belong to what they called the main reef or older mines are very content now-a-days to be considered to belong to the Far Eastern Rand. Why? Because it is not so patchy as the older and wasted main reef, wasted that is, in the sense of a dying asset, its life being counted in years that are sometimes few. If this country, industry and people are to be allowed to live, the wholesale development of the Far Eastern Rand must be pushed at once and by everybody. And, pushing it as hard as you can, there will be many times as much left for our children as you, since the main reef's discovery, have had the handling of. It must ever be remembered, as a spur to enterprise, to the necessity for quick and lively action, that many of the companies which are to-day producing gold largely and paying handsome dividends, will in a few years be worked out and finished. You may say yes, that is true, but there are mines coming along to take their place. That may be so to a limited extent, but I beg you to look at the larger future, and remember that you have to replace all the time. And remember, too, that you cannot make every gold mine in two, three or four years. It is just six years since the Barnato Group tackled Government Areas. They lose no time and yet they are only now beginning to produce. It is just six years since I visited Springs with the late Mr. Hamilton to see him cut the first sod in the Springs Mines property—the Mines Selection are no slackers either; they are down on their reef and pushing development, but it will still take them some months to get to returns. And so it is with others. Strife, rebellion, too much politics, selfishness, jealousies and unrest have hitherto strangled the natural development of this country and industry. I can only hope that following upon the elections and the re-affirmation of the country's support and approval of the Government—having so to say, given them a clean bill of health, they will forthwith formulate a bold and fearless and a fighting policy to uphold and advance this great industry. Such a policy was indicated at our last meeting, and as you know it has been freely discussed and largely approved in the Press and elsewhere. That policy is a frank recognition by the Government of the fact that the people of the country are the predominant partners in the mines, and that it is the Government's duty to see that the gold which the Empire and the world wants, and which can be got here more readily and in greater quantity than anywhere else, is no longer left as a buried talent. It was suggested that if the Government did not see their way to grant such terms and conditions as would attract capital, then it was the obvious duty of the Government, as representative of the largest proprietors—in other words the people—to provide that capital. But I think it is apparent that the Government now sees the absolute necessity of pushing this new field in order to sustain our industry, find work for the people, and provide their own coffers with the still more necessary gold so urgently wanted. Therefore, I confidently hope that the Government will grant attractive conditions. If they do so, well, money has been available in the past, and will be available again. I frankly admit that the Government to-day are showing every disposition to meet and foster the natural development of the mining industry. I think I may say that the future of this country inspires greater hope to-day than ever before in its history (that is only my opinion, gentlemen), and given that we play our parts like men in the larger South Africa which to-day is in the making, a great big prosperous and progressive South Africa will arise Phoenix-like out of the ashes of failures which, soon I trust, will be regarded as ashes of the past—an Africa and people beloved and respected and carrying with them the well-wishes of all the world, with doors that are open to all. (Applause.)

The reports were adopted and Messrs. L. Edwards and Julius Jeppe were re-elected to the directorate.

TRANSVAAL AND DELAGOA BAY.

17½ Per Cent. Dividend.

SOUND POSITION.

The annual meeting of the Transvaal and Delagoa Bay Investment Co., Ltd., was held in the board-room of the Exploration Buildings on December 1. Mr. S. C. Black presided, and the others present were Comte de Ferreires and Messrs. W. J. Gold, S. Fleischer, J. T. Goldsbury, P. C. Haviland, G. Scheuermann, J. Emrys Evans, and the secretary, Mr. B. Moses.

The Chairman, in moving the adoption of the report and accounts, said: In the midst of troublous and discordant times it is a pleasant task to submit to you the report and statement of accounts for the year ended August 31, 1915, because the results are again such as cannot be considered otherwise than satisfactory. Our trade has diminished slightly in volume, but you will understand that the abnormal conditions prevailing throughout the year are entirely responsible. We were faced with a treacherous local rebellion and a campaign in German South-West Africa, and we cannot be too grateful for the successful crushing of the former and the brilliant victory achieved in the latter—results due to the bravery of our gallant troops under the able leadership of Generals Botha and Smuts. Moreover, we have been and are still under the influence of the gigantic struggle in which the Empire is engaged.

Net Profit, £41,486.

You will observe from the accounts that the realised net profit, after writing off £9,019 13s. 3d. for depreciation, amounts to £41,486 16s. 8d.; we brought forward last year £95,446 19s. 8d., making the total to credit of profit and loss account £136,933 16s. 4d. We recommend payment of the same dividend as last year, viz., 17½ per cent. (3s. 6d. per share), which will absorb £32,375. This leaves £104,558 16s. 4d. to be carried forward, an increase of £9,111 16s. 8d. as compared with last year. Cash and equivalent assets amount to £113,168 13s. 9d., and you will agree that our financial position is a particularly strong one. In this connection you will notice from the report that we have acquired £37,000 of short-dated British Treasury Bills and £2,500 of the 4½ per cent. War Loan. Our holdings in debentures and shares stand in the books well under present quotations.

Collieries.

Dealing now with your important coal-mining property, you will observe that the operations of the Transvaal and Delagoa Bay Collieries have been maintained at practically the same steadiness as heretofore. The output reached a total of 555,452 tons, which is 31,263 tons less than 1914. I have already mentioned the causes for this decrease; there was not any lack of orders, but from November to March last railway traffic became disorganised through military exigencies. Were it not for this circumstance our output would probably have exceeded that of the previous year. Our No. 2 mine is in excellent working condition, and the coal maintains its high quality. Machinery and plant are all in good running order, and we experience no difficulty whatever in responding to special orders for coal, often well beyond the normal demands of the current trade. Briefly, there are times when an excess of output is required at short notice for shipping purposes, and I am glad to say that we possess plenty of marginal elasticity to supply an extra quantity whenever it is called for. Our No. 1 mine, which, as you are aware, is fully equipped with machinery and plant, was not utilised during the past year. I need but reiterate what I stated at our last annual meeting, that we regard it as a most useful auxiliary colliery, invaluable in the event of any accidental breakdown at No. 2, or, should occasion arise, for the purpose of adding appreciably and expeditiously to our output.

Welfare of Natives.

I referred also at that meeting to the construction of a reservoir for conserving a large store of water. I am glad to say it was completed well within time and at the estimated cost. It has been filled to overflowing since December last, affordng a full and abundant supply for all our requirements. In fact, I may hazard the opinion that we shall never again, even in dry seasons, lack a supply of pure water. The net capital expenditure during the year was limited to the moderate sum of £2,321 5s. 10d. We again made, as I have already stated, very liberal provision for depreciation, viz., £9,019 13s. 3d., which includes writing down the cost of our railway line. You will notice amongst other matters contained in the general manager's report, reference to the mortality rate of our native employes. We have usually been able to record a low rate in our compound, but 5.95 per 1,000 is surprisingly so, and I can only hope that it will be possible to maintain such exceptional figures. It is a matter reflecting great credit on all concerned; it is comparatively easy to maintain a high standard of hygiene among the white employes—due to the favourable conditions under which they live and work—but the welfare of natives demands our constant attention, considering the great difference between their previous mode of life and their employment on a mine, mostly below the surface.

Gift to the Navy.

The Transvaal Coal Owners' Association has continued to carry on its distributing operations with considerable success. I should like to mention that it was agreed by some of the collieries situated in the Witbank district of the Transvaal, whose product is suitable for oversea use, to offer through the association 100,000 tons of coal gratis at pit's mouth, to the British Government. This offer was accepted, and I feel sure shareholders will cheerfully endorse our action. We estimate our proportion at approximately 15,500 tons, and delivery will take place as and when required by His Majesty's Government. Every endeavour is being made to find new outlets oversea for Transvaal coal, and when more favourable shipping freights prevail, I look hopefully to the expansion of the export trade. The latest trials of Transvaal coal on the Soudan railways have proved to be very satisfactory, and the cost, at the point of delivery, in comparison with Welsh coals is entirely favourable to our product.

Land Interests.

The schedule of our Delagoa Bay properties remains unchanged. The war has affected the port adversely, but the same remark applies to all other South African ports, and I can but express the hope that an improvement may eventuate at not too distant a date. With regard to some of our freehold land interests, I informed you last year that we had effected an exchange of areas with the Transvaal Consolidated Land and Exploration Co., Ltd., so as to secure to each company the full ownership, instead of each holding farms with an undivided half interest. I then added tnat identical arrangements would probably be made with respect to some other farms similarly held. The disturbed state of the country in the early part of the year somewhat retarded negotiations, but latterly they have been resumed, and we expect they will be brought to a successful issue ere long.

What Peace would Mean.

Summarising the position in our midst, the temporary closing down of the diamond mines, though inevitable in the circumstances, was most regrettable. The latest authoritative statement that a partial reopening of some of them will shortly take place, is a matter for satisfaction. It is an ill wind, however, that blows no good, and some compensation is found in the large number of natives flocking to the gold mines and enabling increased production of the most needed commodity of the war. The fact that over 223,000 natives are at the present time employed on gold and coal production is certainly a most encouraging feature. If, in addition, South Africa could enjoy a surcease from internal racial strife, it would soon be one of the most contented and progressive parts of the British Empire. With its vast undeveloped areas of vacant land, its incomparable gold and diamond mines, and last, but perhaps most important, its good and cheap steam coal, it is a country of great potentialities. When peace is restored and internal difficulties are settled ,the expansion of its industrial and agricultural undertakings may astonish even the most sanguine. I have much pleasure in expressing our acknowledgments to our general manager at the colliery, Mr. James McPhee, M.Sc., M.E., and to the staffs and all our employes generally, at the head office, the London office, the collieries and at Delagoa Bay.

The report was adopted, and the retiring directors were re-elected. A bonus of £500 was voted to the directors, it being stated that their fees and that of the London Committee only amounted to £204 in the last year.

The Consolidated Gold Fields of South Africa, Ltd.

REPORT OF THE DIRECTORS

Submitted to the Shareholders at the Ordinary General Meeting held at the Cannon Street Hotel, Cannon Street, London, E.C., on Tuesday, the 16th day of November, 1915, at noon.

ACCOUNTS.

The Directors of the Consolidated Gold Fields of South Africa, Limited, present to the Shareholders the following Report on the Company's affairs, with the Accounts for the year ending 30th June, 1915, and Balance Sheet at that date.

CAPITAL.

The Ordinary Share Capital of the Company remains at £2,000,000, and the Preference Share Capital at £2,500,000 in 1,250,000 Six per cent. First Cumulative Preference Shares, and 1,250,000 Six per cent. Second Cumulative Preference Shares.

DEBENTURES.

The Debenture Issue has been further reduced since 30th June by the drawing of £25,000, leaving the outstanding Debentures at present £125,000.

PROFITS.

The realised profit on the year's operations is mainly derived from dividends received on investments, and after deducting Debenture interest and all outgoings shows a balance to credit of £299,151 17s. 5d., from which the dividends on the First and Second Preference Shares and French Government taxes have been provided, leaving £145,616 6s. 1d., which, added to the sum of £84,471 15s. 2d. brought forward from last year, leaves £230,088 1s. 3d.

Investments stand in the books at average cost or under, and all shares are taken into account at prices below those current at the date when the accounts were made up.

The changes that have taken place in the Company's holdings during the past year have not materially affected the general position or nature of the investments.

RESERVE.

The amount to credit of Reserve stands at £800,000.

DIVIDEND.

The Directors recommend that a cash dividend of 7½ per cent., free of Income Tax, be paid on the 2,000,000 Ordinary Shares, amountig to £150,000, leaving £80,088 1s. 3d. to be carried to the credit of the current year's Profit and Loss Account.

TRANSVAAL.

The usual annual reports by the Manager of the Company in Johannesburg (see page 14) and by the Superintending Engineer (see page 23) are appended.

In spite of the war in Europe and German South West Africa, and of the rebellion in South Africa, which caused a large efflux of white employees from the mines and a marked rise in freights, insurance, and in the cost of material of all kinds during the past financial year, mining operations proceeded without interruption, and owing to the loyal services of those continuing at work on the mines, and to the increased supply of native labour during this period, the results have been practically unaffected.

ROBINSON DEEP G.M. CO., LTD., AND BOOYSENS ESTATE, LTD.

The negotiations referred to in previous years were resumed between the Robinson Deep Gold Mining Company, Limited, in which the Company holds about 41 per cent. interest, and the Booysens Estate, Limited, South Deeps, Limited, and Booysens Freeholds, in which ventures the Company holds about a 50 per cent. interest, on lines which recognised the value of the assets of and advantages possessed by the Robinson Deep Gold Mining Company, the desirability of extending the life of that mine, and the estimated value of the mining properties and surface rights owned by the other Companies.

The Provisional Agreement eventually arrived at, which will be submitted to General Meetings of the Shareholders concerned on the 11th November, has the approval of the Company. The Directors consider that the agreement fairly and equitably protects the interests of all the shareholders represented by them.

Should the agreement be adopted, a new Company will be formed for the purpose of acquiring the various interests, with a capital of £925,000, consisting of 500,000 "A" shares of 1s. each, with cumutative preference rights, and 900,000 ordinary "B" shares of £1 each, of which the Company would receive for its shareholding in the Robinson Deep Gold Mining Company 205,000 "A" shares, and for its shareholding in Booysens Estate and South Deeps, and as Booysens Freeholders, 640,900 "B" shares.

The life of the new Company is estimated to be not less than 25½ years from the 1st July, 1915

JUPITER GOLD MINING CO., LTD.

Advantage was taken of the improved native labour supply during the year to make arrangements for the restarting of the Jupiter Mine, which led to the resumption of crushing operations on September 1st last.

SUB-NIGEL, LIMITED.

At the Sub-Nigel Mine development justified the erection, during the year, of additional reduction works, by means of which an increased tonnage is now being treated.

RHODESIA.

GOLD FIELDS RHODESIAN DEVELOPMENT CO., LTD.

All details in connection with the Gold Fields Rhodesian Development Company's affairs and with the results of the mines under its control were fully reported at the Annual Meeting of that Company held on 17th August last. The scarcity of skilled white labour and the rise in price of mining material, in freight and in insurance, consequent on the war, affected the results of the principal crushing mines, which have otherwise made satisfactory progress. Under the existing financial conditions it has not been possible to consider the resumption of work on the non-crushing mines, but, on the other hand, the revenue from dividends and the commencement of repayment of loans outstanding is gradually strengthening this Company's financial position. The results of the principal crushing mines may be summarised as follows:—

Shamva Mines, Limited.—Three interim dividends amounting to 20 per cent. have been paid during the 9 months ending September 30th last, and the profits being made should justify the continuance of dividends at the present rate and eventually on an improving scale. Recent development on the 5th (at present the lowest) level is encouraging.

Antelope Gold Mine (Rhodesia), Limited.—The total monthly returns from 1st October, 1914, to the end of September, 1915, show an estimated net profit of £27,800. Development continues satisfactory.

Falcon Mines, Limited.—From 1st June, 1914, to 30th June last, 130,567 tons were treated, producing 2,611½ short tons of blister copper, which should realise £324,000, the profit on which can at present only be gauged approximately. The Consulting Engineer considers the prospects of the mine to be very good, and satisfactory arrangements have been made for marketing its product.

Eldorado Banket Gold Mining Co., Ltd.—The profit for the year ending 31st March last amounted to £62,597, out of which 17½ per cent. was paid in dividends. Development on the 16th level (the lowest level) gives satisfactory indications of improvement as regards lateral extension.

AMERICA.

GOLD FIELDS AMERICAN DEVELOPMENT CO., LTD.

As will be seen from the report of the Chairman of the New York Committee of the Gold Fields American Development Company, Limited (see page 34), which deals with its principal investments, good progress has been made despite the fact that the war has caused disorganisation of business, and of traffic by sea, and has hampered construction work, and that unrest has continued in Mexico. The heads of the report may be briefly summarised as follows:—

The Consolidated Gold Fields of South Africa, Limited.—continued.

POWER COMPANIES.

Mississippi River Power Company. Although general business conditions were unsatisfactory during 1914-15, the previous net earnings have been maintained.

The Sierra Pacific Electric Company.—The net earnings have been somewhat reduced, but there are good prospects of gradual improvement.

OIL.

Transcontinental Consolidated Oil Company, Ltd.—This Company was registered in London in January, 1915, as a holding Company, and has taken over the property and assets of the Vera Cruz Mexican Oil Company, Limited, and of the Transcontinental Petroleum Company. In spite of the unsettled state of affairs in Mexico and of the low market price for oil, this Company has earned substantial profits and has paid the preference dividend which fell due on the 1st July last.

International Petroleum Company.—This Company continues to show good promise, but is also dependent upon restoration of good order in Mexico.

GOLD.

Natomas Consolidated of California.—For the year ending 31st December, 1914, the net earnings showed a substantial increase over the previous year. The reorganisation of the Company referred to in the last report has placed the affairs of the Company in a satisfactory condition.

The Oroville Dredging Company, Limited.—This Company paid dividends amounting to 5 per cent. during 1914, and from the beginning of 1915 has resumed the payment of quarterly dividends at the rate of 10 per cent. per annum. Satisfactory returns continue to be made by the Pato Mines (Colombia), Limited. The Nechi Mines (Colombia), Limited, commenced dredging operations on the 1st September, 1915, and the profits of the Oroville Dredging Company, Limited, which holds a preponderating interest therein and in the Pato Mines (Colombia), Limited, should be eventually considerably increased.

The Yuba Consolidated Goldfields.—Results for the fiscal year showed an increase of more than 20 per cent. in net earnings over the preceding year, and further improvement is anticipated.

The Granville Mining Company, Limited.—For the 1914 season the output of gold of the Canadian Klondyke Mining Company, Limited, amounted to 66,189 ounces, and the operating profit was approximately $550,000, the falling off as compared with the previous season being chiefly due to an accident which put one of the largest dredges out of commission for a considerable period. This dredge has since been repaired, and it is expected that the returns for the current season will be slightly in excess of those obtained in 1914.

The North West Corporation, Limited, has recently erected an excavating and washing plant on its property which, though shipped too late in the season to earn any considerable profit, will provide useful data as to the further equipment necessary for the exploitation of the property on a large scale.

POTASH, ETC.

The Foreign Mines Development Co., Ltd.—This Company's interest in the American Trona Corporation, which it is anticipated will be enabled to market its products early next year, remains unaltered.

WEST AFRICA.

GOLD

No increase in mining activity has been shown on the West Coast of Africa during the last year.

The Abbontiakoon Mines, Limited, has, up to the termination of its financial year, declared dividends of 15 per cent., and this year has declared a further 5 per cent. dividend.

Cinnamon Bippo Company, Limited.—From the commencement of crushing up to the 31st July, 1915, 55,573 tons of ore have been treated at a profit, which has considerably assisted in reducing the debt this Company has incurred.

TIN.

Ropp Tin, Limited. The production continues satisfactory. A dividend of 25 per cent. free of Income Tax was paid in July last, and dredges, together with the necessary motive power plant, have been ordered. It is hoped that operations will be started on a large scale during next year.

OUTSIDE VENTURES.

GOLD AND PLATINUM.

Anglo-Colombian Development Company, Ltd.—The dredge mentioned in the last year's report has been erected, and is now working on the Condoto River. The operations to date bear out the estimates given during the prospecting period.

OIL.

Trinidad Leaseholds, Limited.—Further geological examinations of this Company's areas have been conducted, the results of which are generally satisfactory. Drilling operations are confined for the time being to the Forest Reserve area, upon which nine wells have been sunk to the oil horizon. Eight of these may be estimated to become steady producers, and further wells are being put down. This Company has entered into an Agreement with the Trinidad Government to lay a pipe-line from its properties to the Coast; the necessary plant has been delivered and the work of laying the pipe-line commenced.

STAFF.

Mr. Douglas Christopherson, hitherto one of the Joint Managers of the Company in Johannesburg, has been appointed Manager, and Mr. F. Leslie Brown and Mr. C. Hely-Hutchinson have been appointed as Assistant Managers.

The Directors are pleased to bring to the Shareholders' notice the efficient services rendered by the Company's staff, to whose energy and ability, as in past years, so much is due.

Up to the present 64 members of the Company's staff in London have joined His Majesty's Forces. It is with much regret that the Directors have to record that two members have fallen in action. Many of those not eligible for military duties have placed their leisure time at the disposal of the Civil Authorities or are engaged in the manufacture of munitions.

In South Africa also the staffs of the Company and of the Gold Fields Rhodesian Development Company, Limited, and the employees of the Mining Companies in which they are interested have given the most loyal assistance in men and money to the Forces of the Crown.

RE-ELECTION OF DIRECTORS.

Lord Brabourne, Sir Leigh Hoskyns, and Colonel E. Frewen retire under the Articles of Association, and, being eligible, offer themselves for re-election.

AUDITORS.

The Auditors, Messrs. Turquand, Youngs and Company retire and offer themselves for re-election.

For the Board of Directors,

HARRIS.
E. BIRKENRUTH.
Directors.
HERBERT C. PORTER,
Secretary.

8, Old Jewry,
London, E.C.,
6th November, 1915.

Dr. PROFIT and LOSS ACCOUNT, 1st JULY, 1914, to 30th JUNE, 1915. Cr.

Dr.	£	s.	d.	Cr.	£	s.	d.
Directors' Fees, Engineering Department, Salaries, Office and other Expenses, London, South Africa, and Paris, less Amounts received from other Companies, including Transfer Fees	12,229	6	6	Dividends, Profits realised by Sales of Investments, and Sundry Receipts, less Amounts written off	323,246	0	11
Subscriptions and Donations	3,614	17	0				
Debenture Interest	8,250	0	0				
Balance carried down	299,151	17	5				
	£323,246	0	11		£323,246	0	11

	£	s.	d.		£	s.	d.
First Preference Dividend, 6 per cent. for year ...	75,000	0	0	Balance brought down	299,151	17	5
Second Preference Dividend, 6 per cent. for year ...	75,000	0	0	Balance brought forward from 30th June, 1914 ...	84,471	15	2
French Government Duty and Stamps	3,535	11	4				
Balance carried to Balance Sheet	230,088	1	3				
	£383,623	12	7		£383,623	12	7

The Consolidated Gold Fields of South Africa, Limited.—continued.

Dr. BALANCE SHEET, 30th JUNE, 1915. Cr.

CAPITAL AND LIABILITIES.

Capital Authorised and Issued—		
2,000,000 Ordinary Shares of £1 each	£2,000,000 0 0	
1,250,000 6 per cent. 1st Preference Shares of £1 each	1,250,000 0 0	
1,250,000 6 per cent. 2nd Preference Shares of £1 each	1,250,000 0 0	
		£4,500,000 0 0
Reserve—		
Invested in British and Colonial Government Securities, and the General Assets of the Company		800,000 0 0
Liabilities—		
5½ per cent. Debentures issued at 95, and redeemable at par by 24 annual drawings, of which the nineteenth is due 1st July, 1915		150,000 0 0
Simmer and Jack East 2nd Debenture Guarantee—		
Reserve for Guarantee to 31st August, 1921, as per last Balance Sheet	£119,543 14 10	
Less Proportionate value of the Interest paid during year	15,939 3 4	
		103,604 11 6
Sundry Creditors		216,312 10 10
Preference Dividends—		
Six months due at date, 1st Preference		33,591 8 2
Three months accrued at date, 2nd Preference		18,750 0 0
Debenture Interest—		
Six months due at date		3,766 9 10
Proprietors' uncleared Warrants and Coupons—		
Debenture Interest	84 1 4	
Preference Dividends	1,613 5 2	
Ordinary Dividends	3,392 19 7	
		5,090 6 1
Profit and Loss Account—		
Balance at Credit		230,088 1 3
Contingent Liabilities—		
Uncalled Capital on Investments, etc.	£544,701 0 0	
		£6,061,203 7 8

Note.—In addition, the Company has guaranteed the following:
Principal and Interest of £47,100 Knights Deep, Ltd., 5½ per cent. Debentures.
Interest of £583,400 Simmer Deep, Ltd., 5½ per cent. First Debentures for a period of 25 years computed from 1st October, 1906.

PROPERTY AND ASSETS.

Investments—		
Shares in Companies at or under cost	£3,770,651 12 7	
Properties and Ventures ...	35,000 0 0	
Investments on Account of Reserve	384,296 1 8	
		£4,189,947 14 3
Pre-War Stock Exchange Loans		385,763 3 2
Sundry Debtors and Dividends declared		244,651 2 7
Cash Advances and Mortgages		809,739 2 6
Real Estate and Buildings		105,887 4 11
Office Furniture		5,455 19 5
Stock and Sundry Assets		1,014 19 1
Cash at Bankers and in hand		318,744 1 9
		£6,061,203 7 8

HERBERT C. PORTER, Secretary.

HARRIS,
S. CHRISTOPHERSON. Directors.

We report to the Shareholders that we have obtained all the information and explanations we have required as Auditors. We have examined and compared the above Balance Sheet with the Books and Vouchers of the Company in London and the Accounts received from South Africa. The investments, after making such provision for contingencies as is considered necessary by the Directors, are taken at or under average cost price, and in no case over the Stock Exchange markings where quoted up to and including 30th June last. The profit on investments is generally arrived at by deducting the average cost price of the Shares sold from the proceeds, and no increase in value over average cost is taken into Profit and Loss Account. In our opinion the Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs at 30th June last, according to the best of our information and the explanations given to us, and as shown by the Books of the Company.

London, 3rd November, 1915.

TURQUAND, YOUNGS AND CO., Auditors.

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TURBINE PUMPS.
Also SLIMES, TAILINGS AND WATER PUMPS.
(40 Years' Experience).

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THE LANSING CO.: Barrows, trucks, concrete mixing machines.
THE AMES SHOVEL & TOOL CO.
THE SEQUATCHIE HANDLE CO.
RAMSAY, SON & CO.: Paints, enamels, etc.
THE BARRETT MANFG. CO.: Roofing felt, floor coverings, disinfectants and Tarira.
And other Canadian and American Companies. *INDENTS ONLY.*

Consolidated Main Reef Mines and Estate, Ltd.

(Incorporated in the Transvaal.)

DIRECTORS' REPORT
For the Year Ended 30th June, 1915,

Submitted to the Seventeenth Ordinary General Meeting of Shareholders, held in the Company's Board Room, Cullinan Buildings, Johannesburg, on Friday, the 26th November, 1915, at 11 a.m.

To the Shareholders,

Consolidated Main Reef Mines and Estate, Limited.

Gentlemen,—Your Directors beg to submit their Report, together with the Reports of the Consulting Engineer and General Manager, as also the Financial Statements for the year ended 30th June, 1915.

PROPERTY.

With the exception of the sale of the freehold of certain stands in the Maraisburg Township, there has been no change in your Company's property since the last General Meeting.

MINING OPERATIONS.

The Reports of the Consulting Engineer and General Manager give full details of the work accomplished during the year under review.

The tonnage crushed during the year shows an increase of 53,759 tons, with a corresponding improvement of profit earned of £21,656.

The payable Ore Reserves show an increase from 693,460 tons, valued at 7.34 dwts over 48.6 inches, to 855,600 tons, valued at 7.53 dwts. over 48.5 inches.

FINANCIAL.

The Appropriation Account may be summarised as follows:—

Credit Balance brought forward from previous year			£65,423 5 1
Profits earned during year … … … … … … … …			138,265 7 3
Owners share of Claim Licences, Interest and Sundry Revenue … … … … … … … … … … … …			9,674 19 3
			£213,363 9 7
From which have to be deducted:—			
Government Tax on Profits for previous year	£9,961 12 0		
Audit Fees for previous year… … … … … …	315 0 0		
		£10,276 12 0	
Shaft Sinking … … … ..	9,470 16 5		
Dividends Nos. 13 and 14, declared during the year	115,545 10 0		
Directors' extra remuneration in accordance with the Company's Articles of Association … … …	1,700 0 0		
Contribution to Miners' Phthisis Compensation Fund … … … … … …	5,324 4 6		
Sundry Items … … …	1,172 5 5		
		133,212 16 4	
			143,489 8 4
Leaving a balance to be carried forward of … … …			£69,874 1 3

The following items of Capital Expenditure have been incurred during the year:—

Buildings … … … … … … … …		£1,789 15 8
Machinery and Plant … … … … …		11,395 16 9
Shafts … .. … … … ,… … … … …		19,973 0 3
Furniture . . … … … … … … … …		17 10 0
Stable Equipment … … … … … … …		11 11 10
Dams and Surface Works … … … …		309 15 6
		£33,497 10 0
Less—		
Proceeds of Sale of Freehold Stands in Maraisburg … … … … … … …	£260 0 0	
Investments sold … … … … … … …	25 15 0	
		285 15 0
		£33,211 15 0

Of this total a sum of £9,470 16s. 5d. has been written off against the year's profits, the remainder being provided from the funds secured under the amalgamation scheme in 1909, the balance of cash available from this source being at 30th June, 1915, £16,379 19s. 2d.

DIVIDENDS.

On the 31st December, 1914, your Directors declared an interim dividend (No. 13) of 1s. 3d. per share (6¼ per cent.), for the first half year, and on the 30th June, 1915, a dividend (No. 14) of 1s. 3d. per share (6¼ per cent.) was declared for the second half-year, making 12½ per cent. for the year. You will be asked to confirm your Board's action in the matter.

STAFF.

Your acknowledgments are due to your Consulting Engineer, your General Manager, and their staffs, for the able and zealous manner in which they have carried out their duties during the year.

DIRECTORATE.

In accordance with the Company's Articles of Association, all the members of your Board retire from office, but, being eligible, they offer themselves for re-election. The retiring Directors are Messrs. W. H. Dawe, C. S. Goldmann, A. A. Auret, J. H. Ryan, A. G. Gill, E. A. Wallers, F. R. Lynch, H. J. King, E. J. Renaud and W. H. B. Frank.

AUDITORS.

The retiring Auditors, Mr. J. P. O'Reilly and Messrs. A. Aiken & Carter, being eligible, offer themselves for re-appointment. You will be asked to appoint Auditors for the current year, and to fix the remuneration for the past audit.

We are, Gentlemen,

Obediently yours,

W. H. DAWE, Chairman.
A. G. GILL,
O. SCHEUERMANN,
J. JOURDAN,
J. H. RYAN,
W. ROCKEY,
M. HONNET,
F. R. LYNCH,
J. EMRYS EVANS,
P. DREYFUS, Directors

Johannesburg, 27th August, 1915.

Consolidated Main Reef Mines and Estate, Limited.—continued.

Dr. BALANCE SHEET, 30th JUNE, 1915. Cr.

Dr.			
To Capital—			
950.000 shares of £1 sterling each		£950.000 0 0	
25.636 shares in reserve		25.636 0 0	£924.364 0 0
924.364			
,, Funds Transferred from Appropriation Account—			
As per last account		135,673 16 5	
Expenditure on sinking of old shafts for year ended 30th June, 1915	£9.730 16 5		
Less received for sale of stands ...	260 0 0	9.470 16 5	145.144 12 10
			1.069,508 12 10
,, Sundry Shareholders—			
Dividend No. 14 declared and unpaid		57,772 15 0	
Dividends Nos. 1 to 13 unpaid ...		3.895 3 11	
Share Fractions unpaid		253 1 7	
Debenture Interest unpaid		6 2 3	61.927 2 9
,, Sundry Creditors, etc.			36,143 19 5
,, Balance—			
Appropriation Account			69,874 1 3
Contingent Liability on Shares—			
Witwatersrand Native Labour Association, Ltd.—623 shares at 8s.		249 4 0	
Native Recruiting Corporation, Ltd.—12s. 6d. per native uncalled on complement of 2,610 natives		1.631 5 0	
Witwatersrand Co-operative Smelting Works, Ltd.—688 shares at 12s.		412 16 0	
		£2,293 5 0	
			£1,237,458 16 3

There are Contingent Liabilities on machinery contracts, etc., amounting to £3.166 1s.

No provision has been made for the following:—

Government Tax on Profits for the year ended June 30, 1915.

Special War Levy for Period April to June, 1915.

Income Tax for year ended June 30, 1915.

Cr.		
By Property—		
Freehold of Farm Paardekraal No. 42, Township of Maraisburg, Mynpachten, Mining Claims, Water Rights, etc., as per last account	£495.780 0 0	
Less received for sale of Freehold Stands, Maraisburg Township . .	260 0 0	£495.520 0 0
,, Buildings		61,601 5 10
,, Machinery and Plant		289,819 14 11
,, Shafts	48,190 2 2	
,, Shaft No. 3 (Deep Level)	144,348 16 11	192,538 19 1
,, Furniture	442 9 4	
,, Stable Equipment	388 0 0	
,, Dams and Surface Works	2.584 14 6	3.415 3 10
,, Investments—		
Witwatersrand Native Labour Association, Ltd.—623 shares of £1 sterling each, 12s. paid up and 25s. per share deposit ...	1.152 11 0	
Native Recruiting Corporation, Ltd.—27 shares of £1 sterling each, £27, and deposit in respect of native complement, £978 15s.	1.005 15 0	
Witwatersrand Co-operative Smelting Works, Ltd.—688 shares of £1 sterling each, 8s. per share paid up	275 4 0	
Victoria Falls and Transvaal Power Co., Ltd.—7,500 Preference Shares	7,500 0 0	
Rand Mutual Assurance Co., Ltd. —30 shares of £10 sterling each	300 0 0	10,233 10 0
		1,053.128 13 8
,, Bearer Share Warrants	482 5 6	
,, Stores on Hand	34.590 10 7	
,, Sundry Debtors—		
Including Native Labour Expenses, Gold Insurance, and sundry payments in advance ...	23.208 2 0	
Main Reef East, Ltd.—Shareholders' unpaid calls...	911 15 0	
Main Reef Deep, Ltd.—Shareholders' unpaid calls...	911 15 0	60.104 8 1
,, Gold Consignment Account		24.210 8 6
,, Cash—		
Current Account, Johannesburg...	26.465 18 11	
Deposit with Bankers	70,000 0 0	
Dividend Accounts, Share Fractions, and Debenture Interest Accounts, Johannesburg and London	1,931 3 5	
Current Account, London	581 5 4	
Cash at Mine	1,036 18 4	100,015 6 0
		£1,237,458 16 3

A. GREGOR, Acting Secretary.

W. H. DAWE, Chairman.
J. H. RYAN,
M. HONNET,
Directors.

To the Shareholders,—

Consolidated Main Reef Mines, and Estate, Ltd.

We have examined the above Balance Sheet with the Books and Vouchers of the Company and have received all the information and explanations we have required. In our opinion the Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and to the explanations given to us and as shown by the Books of the Company. Payment has been made to the authorities in England of dividends due to Alien Enemies in accordance with the Trading with the Enemy Amendment Act, 1914 (England).

J. P. O'REILLY,
Incorporated Accountant (Eng.).
A. AIKEN & CARTER. Auditors.

Johannesburg, 29th August, 1915.

Consolidated Main Reef Mines and Estate, Limited.—continued.

Dr. REVENUE and EXPENDITURE ACCOUNT for the Year Ended 30th June, 1915. Cr.

Dr.		
To Mining Expenses	£99,240 8 5	
,, Hauling Expenses	27,950 0 7	
,, Mine Pumping	8,261 15 6	
,, Underground Tramming and Shovelling	23,732 11 5	
,, Development Expenses	43,188 12 3	
,, Underground Administration	11,379 3 10	
,, Surface Ore Transport, Crushing and Sorting	9,556 5 9	
,, Milling Expenses	21,859 1 8	
,, Cyaniding Expenses	20,263 16 11	
,, General Mine Charges	22,789 9 5	
		£288,221 5 9
,, Charges—		
Claim Licences and Farm Tax ...	5,414 15 0	
Salaries, Directors' and Consulting Engineer's Fees	6,700 0 0	
Cables, Telegrams, Postages, Stationery, Printing, Advertising, Legal Expenses, Exchange, Commission and General Charges...	2,273 10 3	
Profits Insurance	263 7 6	
London and Paris Office Expenses (including London Committee Fees)	1,511 11 2	
		16,163 3 11
,, Balance—		
Appropriation Account		138,265 7 3
		£442,649 16 11

Cr.		
By Mill Account—		
Mill, 79,767.270 ozs. fine gold from 294,766 tons milled	£332,483 5 9	
Cyanide, 26,436.513 ozs. fine gold from 294,766 tons treatd . . .	110,166 11 2	
		£442,649 16 11
		£442,649 16 11

Dr. APPROPRIATION ACCOUNT for the Year Ended 30th June, 1915. Cr.

Dr.	
To Auditors' Fees—	
For year ended June 30, 1914	£315 0 0
,, Government Tax on Profits— For year ended June 30, 1914 ...	9,961 12 0
,, Expenditure on Capital Account— Expenditure on Sinking Old Shaft for period ended June 30, 1915, less received for Stands sold ...	9,470 16 5
,, Dividend No. 13 of 6¼ per cent....	57,772 15 0
,, Dividend No. 14 of 6¼ per cent....	57,772 15 0
,, Directors' Extra Remuneration— In accordance with the Company's Articles of Association for the year ended June 30, 1915	1,700 0 0
,, Estate Salaries, Expenses, etc. . .	349 5 10
,, French Fiscal Duties	489 1 7
,, Income Tax paid in London	253 4 9
,, Income Tax paid in Johannesburg	80 13 3
,, Contribution to Miners' Phthisis Compensation Fund	5,324 4 6
,, Balance— To Balance Sheet	69,874 1 3
	£213,363 9 7

Cr.		
By Balance—		
Brought forward from June 30, 1914		£65,423 3 1
,, Balance— From Revenue and Expenditure Account, being Profit on Working for the year ended June 30, 1915		138,265 7 3
,, Owners' Share of Claim Licences...		4,996 14 2
,, Stand Licences, etc., Maraisburg Township		315 2 0
,, Water Revenue...		561 11 6
,, Interest and Sundry Revenue ...		3,224 11 11
,, Dividends—		
Received on Rand Mutual Assurance Co., Ltd., Shares	£12 15 4	
Received on Victoria Falls and Transvaal Power Co., Ltd. Shares	564 4 4	
		576 19 8
		£213,363 9 7

A. GREGOR, Acting Secretary.

W. H. DAWE, Chairman.
J. H. RYAN,
M. HONNET,
Directors.

J. P. O'REILLY,
Incorporated Accountant (Eng.),
A. AIKEN & CARTER,
Auditors.

Johannesburg, [illegible] August 1915.

MAIN REEF WEST, LIMITED.

(Incorporated in the Transvaal.)

DIRECTORS' REPORT.

For the Year ended 30th June, 1915.

Submitted to the Fourteenth Ordinary General Meeting of Shareholders held in the Company's Board Room, Cullinan Buildings, Johannesburg, on Friday, the 26th November, 1915, at 11.30 a.m.

To the Shareholders,
MAIN REEF WEST, LIMITED.

Gentlemen,—Your Directors beg to submit their Report, together with the Reports of the Consulting Engineer and General Manager, as also the Financial Statements for the year ended 30th June, 1915.

PROPERTY.

No change has taken place since the last General Meeting in your Company's property holdings, which comprise 564 claims, with an actual area of 549.6436 mining claims.

MINING OPERATIONS.

The Reports of the Consulting Engineer and the General Manager give full details of the work accomplished.

During the year 269,520 tons of ore were milled, for a profit of £50,876, as compared with 212,972 tons during 1914 for a profit of £56,641. The working costs showed a decrease of 3s. 3.247d. per ton, whilst the value of the yield decreaed by 4s. 9.772d. per ton.

The payable ore reserves at 30th June, 1915, amounted to 416,280 tons, with an average assay value of 5.87 dwts., over 51 inches, showing a decrease of 110,160 tons over the previous year, with a rise in value of .17 dwts.

FINANCIAL.

The Appropriation Account may be summarised as follows:—

Balance brought forward from last year				£23,414	8	10
Profits earned during year				50,876	2	1
Discount on Debentures purchased				1,569	17	9
Interest, Sundry Revenue and Dividends				797	4	1
				£76,657	12	9
From which have to be deducted:—						
Audit Fees for year ended June 30, 1914	£315	0	0			
Profits Tax for year ended June 30, 1914	3,463	14	0			
Current Shaft Sinking	3,585	9	1			
Provision for Redemption of Debentures	25,000	0	0			
Debenture Interest	14,920	3	1			
Debenture Expenses	217	15	0			
Contribution to Miners' Phthisis Compensation Fund	4,390	8	4			
Income Tax	54	4	3			
				51,946	13	9
Leaving a balance to be carried forward of				£24,710	19	0

The following items of Capital Expenditure have been incurred during the year:—

Buildings	£99	1	7
Machinery and Plant	3,707	16	1
Shafts	4,027	7	1
Fencing and General Surface Improvements	309	15	5
Furniture	17	10	0
Investments	39	12	6
	£8,201	2	8
Less Livestock, Vehicles and Harness written off	462	1	9
	£7,739	0	11

Of this total a sum of £3,585 9s. 1d. has been appropriated out of the year's profits, the remainder being provided from the funds raised by the Debenture Issue, the balance of cash available from this source at June 30, 1915, being £236 7s. 6d.

DEBENTURE ISSUE.

Since the close of the Company's financial year, notice has been given to Debenture holders, through the medium of the press, that a meeting of the holders of Debentures has been convened for the 29th September, 1915, at the London Offices of the Company.

This meeting has been called to consider a proposal to authorise the suspension for three years of the provisions in the Debenture Trust Deed, requiring the Company to redeem or purchase and cancel £25,000 of Debentures annually, and to sanction a corresponding postponement of the final date for completing the redemption of the Debentures.

In approaching the Trustees, relative to the postponement of the redemption of the Debentures for three years, the principal object that your Directors had in view was the desire to husband the Company's resources so as to enable it to undertake the expense of sinking and equipping the two subsidiary incline shafts, which are necessary in order that development of the deeper levels of the mine may be effectively prosecuted.

Details of the work contemplated are given in the Consulting Engineer's Report.

The Trustees for the Debenture Holders have intimated that they are satisfied that it is essential in the best interests of the Debenture Holders, and of the Company, that the proposed work should be carried out, and recommend the Debenture Holders to support the resolution, which will be submitted at the meeting in question.

Provision has, however, been made in the Appropriation Account for the redemption of £25,000.

STAFF.

Your acknowledgments are due to the Consulting Engineer and the General Manager, and their staffs, for the able and zealous manner in which they have carried out their duties during the year.

DIRECTORATE.

In accordance with the Company's Articles of Association, all the members of your Board retire from office, but, being eligible, offer themselves for re-election.

The retiring Directors are Messrs. W. H. Dawe, C. S. Goldmann, E. A. Wallers, J. Munro, H. J. King, C. H. Mullins, W. P. Fisher and A. G. Gill.

AUDITORS.

The retiring Auditors, Mr. H. Hains and Messrs. Fraser & Mackenzie, being eligible, offer themselves for re-appointment. You will be asked to appoint Auditors for the current year and to fix the remuneration for the past audit.

We are, Gentlemen,

Obediently yours,

W. H. DAWE, Chairman.
O. SCHEUERMANN,
M. HONNET,
F. RICHARDSON,
W. P. FISHER,
P. DREYFUS,
S. M. NELSON,
A. G. GILL,
Directors.

Johannesburg, 30th August, 1915.

Main Reef West, Limited.—continued.

Dr. BALANCE SHEET, 30th June, 1915. Cr.

To Capital—			
491,188 shares of £1 sterling each, fully paid			£491,188 0 0
,, Share Premium—			
As per last account			85,000 0 0
,, Six per cent. Mortgage Debentures (Less amonut due on 3rd and 4th instalments—£37)—			
As per last account		£256,223 0 0	
Less Debentures purchased and redeemed to Sept. 30, 1914...	£6,260 0 0		
Debentures redeemable at the rate of £25,000 per annum for period 1st Oct., 1914, to June 30th, 1915...	18,750 0 0		
		25,010 0 0	
			231,213 0 0
,, Funds Transferred from Appropriation Account—			
As per last account		126,179 6 8	
For Expenditure on sinking of East Shaft for year ended June 30, 1915		3,585 9 1	
For redemption of Debentures for year ended June 30, 1915		25,000 0 0	
			154,764 15 9
			962,165 15 9
,, Sundry Shareholders—			
Dividends Nos. 1, 2, 5, 6, 7 unpaid			28 18 1
,, Debentures Redeemable			18,750 0 0
,, Debenture Interest Accrued and Unpaid			3,943 11 9
,, Sundry Creditors, etc.—			
On Current Account			19,964 17 5
,, Balance—			
Appropriation Account			24,710 19 0
Contingent Liability on Shares—			
Witwatersrand Native Labour Association, Ltd.—561 shares at 8s. per share		£224 8 0	
Witwatersrand Co-operative Smelting Works, Ltd.—668 shares at 12s. per share		400 16 0	
Native Recruiting Corporation, Ltd.—Deposit of 12s. 6d. per native uncalled on complement of 3,168 natives		1,980 0 0	
		£2,605 4 0	
			£1,029,564 2 0

There are Contingent Liabilities on Machinery contracts amounting to £129 16s. 8d.

No provision has been made for the following:—

Government Tax on Profits for the year ended June 30, 1915.

Special War Levy for Period April to June, 1915.

Income Tax for year ended June 30, 1915.

By Property—		
Mining Claims as per last account		£395,525 12 11
,, Buildings	£41,773 2 11	
,, Machinery and Plant	220,830 7 11	
		262,603 10 10
,, Shafts—		
East Shaft No. 4	114,505 2 1	
West Shaft No. 5	110,626 18 5	
		225,132 0 6
,, Mine Development		66,412 1 8
,, Fencing and General Surface Improvements	1,454 5 9	
,, Furniture	580 15 7	
		2,035 1 4
,, Investments—		
Witwatersrand Native Labour Association. Ltd.—561 shares, 12s. paid up and 25s. per share deposit	1,037 17 0	
Witwatersrand Co-operative Smelting Works, Ltd.—668 shares, 8s. per share paid up	267 4 0	
Rand Mutual Assurance Co., Ltd. —20 shares of £10 sterling each	200 0 0	
Victoria Falls and Transvaal Power Co., Ltd.—7,500 Preference Shares	7,500 0 0	
Native Recruiting Corporation, Ltd.—28 shares of £1=£28, and deposit in respect of Native Complement, £1,188...	1,216 0 0	
		10,221 1 0
		961,929 8 3
,, Sundry Debtors, Payments in Advance, etc.		3,953 3 6
,, Bearer Share Warrants		72 18 0
,, Gold Consignment Accounts		18.456 15 4
,, Cash—		
Current Account, Johannesburg ...	22.612 14 11	
Deposit with Bankers	21,000 0 0	
Dividend and Debenture Accounts, Johannesburg and London	230 7 5	
Current Account, London	243 11 6	
Cash at Mine	1,065 3 1	
		45,151 16 11
		£1,029,564 2 0

A GREGOR, Acting Secretary.

W. H. DAWE, Chairman.
M. HONNET,
P. RICHARDSON, Directors.

To the Shareholders,—

Main Reef West, Limited.

We have examined the above Balance Sheet with the Books and Vouchers of the Company, and have received all the information and explanations we have required. In our opinion the Balance Sheet is properly drawn up, so as to exhibit a true and correct view of the state of the Company's affairs, according to the best of our information and to the explanations given to us, and as shown by the Books of the Company.

H. HAINS,
Incorporated Accountant (Eng.),
FRASER & MACKENZIE, Auditors.

Johannesburg, 24th August, 1915.

Main Reef West, Limited.—continued.

Dr. REVENUE AND EXPENDITURE ACCOUNT for the Year Ended 30th JUNE, 1915. Dr.

To Mining Expenses	£89.839 10 11	
,, Development Expenses	31.427 13 8	
,, Milling Expenses	24.216 7 2	
,, Cyaniding Expenses	18.827 10 3	
,, Hauling Expenses	27.826 3 3	
,, Mine Pumping	4,964 19 1	
,, Underground Tramming and Shovelling	23.503 16 3	
,, Underground Administration	8.620 7 2	
,, Surface Ore Transport, Crushing and Sorting	5.639 13 11	
,, General Mine Charges	22.922 19 2	
		£257.789 0 10
,, Charges—		
Claim Licences	3,107 5 0	
Salaries, Directors' and Consulting Engineer's Fees	4,600 0 0	
Cables, Telegrams, Postages, Stationery, Printing, Advertising, Legal Expenses, General Charges and Exchange and Commission	1.293 6 4	
Profits Insurance	164 18 2	
London and Paris Office Expenses (including London Committee Fees)	883 13 2	
		10,049 2 8
,, Balance—		
Appropriation Account		50,876 2 1
		£318,714 5 7

By Gold Account—		
Mill, 55,260.901 fine ozs. from 269,520 tons milled	£230,285 16 5	
Cyanide, 21,214.313 fine ozs. from 269,520 tons treated	88,423 9 2	
		£318,714 5 7
		£318,714 5 7

Dr. APPROPRIATION ACCOUNT for the Year Ended 30th JUNE, 1915. Cr.

To Auditors' Fees—		
For year ended 30th June, 1914		£315 0 0
,, Government Tax on Profits—		
For year ended 30th June, 1914		3,463 14 0
,, Expenditure on Capital Account—		
For expenditure on sinking of East Shaft for year ended 30th June, 1915	£3,585 9 1	
,, Provision for Redemption of Debentures—		
For the year ended June 30, 1915	25.000 0 0	
		28.585 9 1
,, Debenture Interest	14.920 3 1	
,, Debenture Trustees' Fees	200 0 0	
,, Debenture Expenses	17 15 0	
		15.137 18 1
,, Contribution to Miners' Phthisis Compensation Fund		4,390 8 4
,, Income Tax—		
Paid in London		54 4 3
,, Balance—		
To Balance Sheet		24.710 19 0
		£76.657 12 9

By Balance—		
Brought forward from June 30, 1914		£23,414 8 10
,, Balance—		
From Revenue and Expenditure Account, being Profit on Working for the year ended June 30, 1915		50,876 2 1
,, Discount on Debentures—		
Purchased for redemption		1,569 17 9
,, Interest and Sundry Revenue		216 19 9
,, Dividends—		
Received on Victoria Falls and Transvaal Power Co., Ltd. Preference Shares to April 30, 1914	£564 4 4	
Received on Rand Mutual Assurance Co., Ltd., Shares	16 0 0	
		580 4 4
		£76.657 12 9

A. GREGOR, Acting Secretary.

W. H. DAWE, Chairman.
M. HONNET,
P. RICHARDSON,
Directors.

H. HAINS,
Incorporated Accountant (Eng.),
FRASER & MACKENZIE,
Auditors.

Johannesburg, 24th August, 1915.

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The South African

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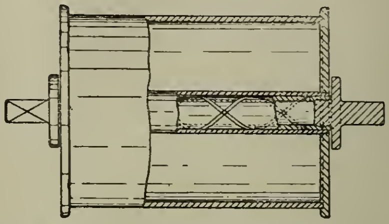

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THE SOUTH AFRICAN
Mining Journal,
WITH WHICH IS INCORPORATED
South African Mines, Commerce and Industries.
ESTABLISHED 1891.

VOL. XXV., PART I.] DECEMBER 11, 1915. [No. 1263.

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NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 2d.

CONTENTS.

PAGE
Notes and News ... 339
Topics of the Week:
Industry and Recruiting ... 341
Rand Geology and the Institution of Mining and Metallurgy ... 342
British Trade with South Africa ... 342
The Oliphants River Mica Belt ... 343
The Position of South African Tungsten and Molybdenum ... 344
The Vereeniging Power Station ... 345
Position and Prospects of Messina Copper ... 347
Oil Shales near Wakkerstroom ... 348
Trade Conditions in South Africa ... 349
November Output: Group Returns ... 351
The Week in the Mining Material and Engineering Trades ... 357
Correspondence and Discussion: "The Commission for Relief in Belgium"; "Orders for Wire"; "Munitions and Industries"; "Tanganyika Concessions" ... 353
Rhodesian Section:
The Latest Mining News ... 354
The Week in the Sharemarket ... 355
Commerce and Industries ... 359
Engineering Notes and News ... 362
Company Meetings: Zaaiplaats Tin; Johannesburg Board of Executors ... i.

Notes and News.

The New Rand, Ltd., Re-starting. It is understood that Mr. A. R. Sawyer has been successful in making financial arrangements in England to re-start drilling on the property of the New Rand, Ltd. Mr. A. R. Sawyer, accompanied by Mr. P. D. Durril, is now on his way out from England to supervise operations on the property.

* * * *

The Government and the Far East. Questions put in the House of Assembly and in the Senate this week elicited the information that the Government was "considering" the question of developing the Far East Rand and the amendment of the Gold Law to that end. It is understood that this is not the usual evasive Parliamentary reply, but that the Government is, as a fact, collecting, with a view to early publication, all the data bearing on the subject.

* * * *

Daggafontein to Re-start. The directors of the Daggafontein G.M. Co., Ltd., have made arrangements with some of the Rand financial houses to advance the money necessary for the development of the property, and operations will be resumed there at the end of the month. Details of the financial arrangements are not available for publication, but it may be said that they are very favourable to the company. The fact that the development of this promising Far East mine is to be vigorously taken in hand should have an excellent effect on the whole district.

* * * *

Earth Tremors Commission Report. We understand that the Earth Tremors Commission has come to the end of its investigations, and presented its completed report to the Government. The latter is now considering the matter, and will doubtless authorise publication of the report at an early date. The secretary of the Commission, Capt. Vaughan, left last week for German East Africa.

* * * *

Workmen Mine Inspectors. In the following notice, the Government notifies adhesion to the principle of appointing workmen mine inspectors for the Rand:—Applications are invited for the posts of two Acting Sub-Inspectors of Mines on the establishment of the Mines and Industries Department, at a salary of £30 per mensem, plus such transport and subsistence allowance as may be necessary. Intending candidates should forward their applications to the undersigned, together with particulars of their qualifications, experience, and copies of their testimonials, not later than the 24th December, 1915. The successful applicants will be selected from amongst working miners with experience of the Witwatersrand Mines, and will be expected to assume duty on the 1st February, 1916." Workmen mine inspectors have been a success in France, but the experiment made in that direction some time ago on the Rand was not encouraging.

* * * *

Antimony Treatment at the United Jack. For some time past there have been the usual rumours about failure in the new antimony treatment scheme at the United Jack mine in the Murchison Range that are commonly circulated during the trial runs of most new processes. At such a distance from headquarters in the event of any section of a plant breaking down or needing alteration, it is obviously impossible to get a new plant into free working condition as easily as it would be upon the Rand, for example. It appears to be quite true that the McArthur process at the Jack is not yet running smoothly, and it has been said that a change in the mesh employed has been suggested as a possible means of improving the performance of the plant. So far, then, the obstacles to be overcome seem to depend upon adjustments that must be made rather than upon any important modification in the process itself.

Vereeniging as an Industrial Centre.

As an inland industrial centre, Vereeniging is now second only to the Rand in importance, and the visit paid to the place last Saturday by representative Rand mining and other engineers, chemists and metallurgists, conveyed many useful lessons. At the Brick and Tile Works the visitors were afforded a valuable object lesson in the ability of a local industry to compete successfully with the imported article through the sheer merit of the finished product. The Steel Works, now turning out an average of 400 tons a month, are remarkable, no less for their performance than for their promise. Steel and iron production are basic industries, fostered by State bounties in other British Dominions, and the Vereeniging Works will doubtless prove the nucleus of a great industry, utilising the iron ores of the country. The present works are, of course, concerned only with scrap, and their capacity to deal with that article is now being considerably enlarged. The power station of the Rand Mines Power Supply Co., Ltd., at Vereeniging, is described and illustrated elsewhere in this issue, and through the courtesy of the company we are enabled to reproduce some excellent views of the station and plant. About 150 members of the South African Institute of Engineers and the Chemical, Metallurgical and Mining Society visited the station on Saturday, and were shown over it by Mr. T. G. Ottey, Mr. Bryden, and other engineers of the V.F.P. The visitors were previously entertained to luncheon by the company and welcomed by Mr. T. G. Ottey, who presided in the absence of Mr. B. Price, acting General Manager of the V.F.P. In the course of his speech, Mr. Ottey mentioned that the station and transmission lines represented a capital expenditure of upwards of a million and a quarter sterling. He also dwelt on the possibilities of a bye-product industry if established at Vereeniging, and he showed how profitable such an industry might become, if only capital could be induced to embark upon it. Mr. Hodges, of the Vereeniging Estates, and Mr. Lavenstein, of the Brick and Tile Works, also spoke; and Mr. Ingham, President of the S.A. Institution of Engineers, and Mr. Thomas, President of the Chemical, Metallurgical and Mining Society, suitably responded on behalf of the visitors. After inspecting the station, all were impressed with the solidity and permanence of the construction work on both main and subsidiary buildings; and it was recognised that the Power Company had taken the long view in laying its plans to meet the growing requirements of a centre still in its industrial infancy.

* * * *

Telephone Directory.

In connection with complaints made regarding the recent new issue of the Telephone Directory, we learn from the Johannesburg Chamber of Commerce that a sub-committee of that body interviewed the Divisional Commercial Superintendent—who explained that condensation had taken place by reason of the necessity of economy in expenditure. He promised to bring before the Postmaster-General the Committee's request that a clearer type should be used in the next issue and that the advertisements be removed from the middle of the page to the top or bottom or to separate pages, so that the names and numbers of subscribers should run consecutively and not be broken into. Nothing, however, appears to have been done regarding the many mistakes that mar the present volume.

* * * *

De Beers and Recruiting.

The secretary to De Beers Consolidated Mines, Ltd., has written to the Kimberley Recruiting Committee as follows:—"Recruiting for Europe and East Africa.—I beg to acknowledge the receipt of your circular letter of the 25th ult., which I regret has been impossible to answer earlier, as the information asked for took some time to compile. I now beg to inform you that the approximate number of men between the ages of 18 and 45 at work in this company is 466. Employees joining the oversea forces are allowed by the company half-pay, and they retain all military pay and allowances. All employees joining the East African contingent and other forces operating in Africa are allowed company's half-pay, less military pay. The situation for all employees will be kept open for them if work is available, but, of course, no guarantee can be given. I may mention that most of the employees of military age are now serving with the forces, and the majority of those left are either medically unfit or over the age limit. In these circumstances any great response to the call for recruits is not to be expected. It should also be borne in mind that the company's works have been closed down for nearly eighteen months; and many able-bodied men have left the company's service and gone to other parts. The company, however, will continue to offer every inducement to men to join, and will retain only the minimum numbers of able-bodied men actually required for the limited amount of work to be started in January next."

* * * *

Feeling the Pinch.

The shareholders of the Zaaiplaats Tin Mining Company, Ltd., have had the somewhat precarious conditions of tin mining pretty fully explained to them during the week by Sir Thos. Murray, who presided at the annual meeting of the company on Monday last. At the Zaaiplaats mine, as elsewhere, the erratic character of the ore bodies has been exemplified abundantly from the outset of the undertaking, although the exceptional richness and bulk of some of them have somewhat obscured this fact to the average shareholder. The main pipe, No. 13, a deposit of phenomenal kind, has been left to bear the chief burden of supplying the mill, owing to the falling off in productivity of what may be called the accessory ore-bodies. It must be remembered that the irregularity of the ore-bodies in the Zaaiplaats mine and the absence of any well defined lines along which exploratory work can obviously be carried out has been a great hindrance to any scheme of systematic development. The arrangement of the pipes has been suggestive of planes of mineralization similar to the lodes of other mines, but nothing quite definite in this direction has hitherto been found. The felsite dyke which has been referred to at various times, however, appears to afford some clue to the direction along which mineralization may have proceeded. It is satisfactory, at any rate, to find that the dyke has had a favourable influence upon the direction taken by the main section of the ore-body. A good deal was said at the meeting about the "pinch" of the No. 13 pipe, but the manager made it clear that "pinches" were not an unusual circumstance at Zaaiplaats, and that "it was only by experience that they could know it was a serious pinch or not." In this case, also, we may hope, the diminution in volume of the main ore-body will prove merely a temporary condition, and that the other occurrences alluded to by the chairman will yield something substantial for helping out the chief source of supply.

* * * *

Copper Mines in Serbia.

A good deal of nonsense has been printed in the daily newspapers about the great supplies of copper that the Teutonic allies are going to gain now that they have conquered Serbia. The copper mines of Serbia are, indeed, a little more important than the alleged copper mines of Poland, but they have never been largely productive. The only copper-producing concern is the company owning the Bor Mines, which previous to the war produced six or seven thousand tons of copper per annum.

* * * *

Mining Engineers at the Front.

In his latest dispatch Sir John French pays the following well-deserved tribute to mining engineers at the Front, of whom there are over 600: "I desire to call your Lordship's attention to the splendid work carried out by the tunnelling companies. These companies, officered largely by mining engineers and manned by professional miners, have devoted themselves whole-heartedly to the dangerous work of offensive and defensive mining, a task ever accompanied by great and unseen dangers. It is impossible within the limits of a dispatch to give any just idea of the work of these units, but it will be found, when their history comes to be written, that it will present a story of danger, of heroism, and of difficulties surmounted worthy of the best traditions of the Royal Engineers, under whose general direction their work is carried out."

Institute of Industry, Ltd.

A company called the Institute of Industry, Ltd., was registered on September 22nd as a company limited by guarantee with an unlimited number of members, each liable for £5 in the event of winding-up, to promote, increase and develop the industrial, scientific, financial and commercial activity of the United Kingdom of Great Britain and Ireland, and His Majesty's Overseas Dominions, Colonies, Dependencies and Possessions, and generally to further and encourage inter-Imperial trade throughout the British Empire by all lawful means, and to capture, retain and develop branches of industry, trade and commerce which have fallen into the hands of those who are now alien enemies of Great Britain, to watch over the interests of non-alien traders in connection with rates charged by railway and shipping companies and other carriers for the conveyance of goods, and to endeavour to obtain the removal or reduction of all unfair excessive rates, tolls and charges. Until otherwise determined, the entrance fee payable on election shall be five guineas in the case of an individual member, not being a representative member; ten guineas in the case of a partnership firm, company, or corporation, with a paid-up capital not exceeding £200,000, or by any unincorporated association or body not having a share capital, or by a member representative of any partnership, company, corporation, or association with a paid-up capital exceeding £200,000; but no entrance fee shall be payable by any of the first thousand members of the Institute (including the subscribers to the memorandum of association). Solicitors: Rutter, Veitch and Bond, Norfolk House, Norfolk Street, Strand, W.C. Secretary, L. Atkinson, Aldwych Site, W.C. Registered office, Exhibition Buildings, Aldwych Site, Strand, W.C.

* * * *

Tungsten and Molybdenum in England.

According to the *Times Engineering Supplement*, the outbreak of war found Great Britain deficient in the supplies of many of the rarer metals employed in steel manufacture, and for a time much anxiety was felt respecting the possibilities of manufacturing in England certain of these metals hitherto obtained in large quantities from the Continent. Among these mention may be made of the compounds of chromium, tungsten and molybdenum. In the case of tungsten, the best wolfram ores are brought from Portugal and India, while the molybdenite used in the preparation of ferromolybdenum comes from Norway, Sweden and Australia. The Australian ores cannot, in the most favourable circumstances, be conveyed from the mines to Britain in less than two months, and as they are extremely costly it would not pay the manufacturer to hold large quantities of ore in reserve. One factory at Luton, England, has now extended its plant so that it is capable of turning out annually nearly 1,000 tons of ferrotungsten and tungsten powder, and it is unlikely that the trade in tungsten powder will ever revert to Germany after the war. The process used at the Luton factory for the production of tungsten powder consists in boiling the finely ground wolfram with a soda solution. The tungstate of soda formed is settled in tanks and dried so as to produce coarse crystals. The compound is then treated with hydrochloric acid in wooden vats, by which means the tungstic acid is liberated as a yellow paste. In order to reduce the acid, it is mixed, after thorough drying, with charcoal in large crucibles and heated for 18 hr. in reverberatory furnace. The slaglike mass thus prepared is crushed and ground to a fine powder, which is finally passed through 120-mesh wire sieves, and represents tungsten of 98 per cent. purity. In the manufacture of ferrotungsten large 3-ton electric furnaces, each with three suspended electrodes, are used. The feeding of the furnaces takes place by hand in small charges of the mixed ore, with the requisite quantity of carbon, scrap iron and flux. The molten masses of ferrotungsten are drawn off from time to time and after cooling are hand-broken and sorted into various sizes. Owing to the great weight of the material, it is a matter of considerable difficulty to handle it in bulk. It is usually packed in steel casks containing 25 cwt.

TOPICS OF THE WEEK.

INDUSTRY AND RECRUITING.

Evidence multiplies daily that the wave of recruiting enthusiasm that has swept over the Rand in the past fortnight has been most successful and that there is now some danger of the essential minimum man-power of the industry being seriously depleted. On Thursday the following message was received by the Transvaal Chamber of Mines from the Minister of Defence, who authorises its publication:—" Attention of Government has been drawn to fact that many skilled men are being recruited from industry. While appreciating keenness, Government desires to remind mining managements of importance of keeping in view necessity for maintenance of industry and of avoiding mistake made in Europe, where skilled men had to be recalled from the front to maintain industrial output." The power supply stations of the Rand have also been hard hit in man power by the exodus to Potchefstroom. Almost all the apprentices of the V.F.P. Co. have volunteered. The following letter has been received by that company from Col. Crewe, Director of War Recruiting:—" In consequence of instructions received from the Government, I am making enquiries where necessary into conditions prevailing in certain services which in the interests of the State must be continued at all costs. In this connection the supply of light and power are of very great importance. I have made enquiries into the position of the Victoria Falls Power Company, in which many men are employed upon special and expert work, and I find that out of a total of 708 Europeans employed, over 100 men have been released for military duty since the war began, and that some others have given up their employment and gone to serve independently. I am therefore satisfied that the Victoria Falls Power Company has given every possible assistance to the State, and I most strongly urge that the remaining employees of the company should realise that their services are essential to the public welfare, and that although they are in these times naturally desirous of rendering military duty they should continue in their present employment, as by so doing they are rendering equally important service to the State. This communication should be posted up for the information of all concerned." The following official notice, which is being posted at coal mines in Great Britain, has been issued, and is signed by the Home Secretary and Lord Derby, the Director-General of Recruiting:—" Coal miners have already joined the Army in such large numbers that the supply of coal, which is of vital national interest, is seriously affected. Miners, one and all, must remember that, upon their efforts the success of the country depends no less than upon the men who are serving with the forces. Those who offer themselves as recruits will only be accepted on the condition that they go back to work in the mine until they are called upon. They will be given armlets to show that they are willing to obey the call, and do whatever will most help their country. But, in the meantime, it is vital that they should not desist from producing the coal without which victory is impossible. This notice applies to all men who are working below ground, and the following classes of surface workers—winding enginemen, pumpmen, weighmen, electricians, fitters, and mechanics." Coal miners as a class have already responded to the call for recruits in such large numbers that no fewer than 250,000 had joined the New Armies by midsummer, and this number has since been increased. In the same connection a noteworthy protest has been lodged by the secretary of the Randfontein Estates, in the course of which the following appears:—" My directors wish me to express their surprise that the Recruiting Committee do not give their attention to the enlistment of the thousands of men throughout the country who are either unemployed or have no occupation connected with the successful prosecution of the war, and are not engaged in the gold mining industry. The Imperial Government, I beg to remind you, has expressed a strong desire that the gold mining industry in South Africa should not be interfered with or hampered in any way, but kept at full stretch so as to produce as much gold as possible in order to assist the Imperial Government in its financial operations connected with the great war. Therefore, it appears to my Board to be exceedingly inadvisable to push recruiting on the gold mines to the undue extent to which it is carried on at present, and it is a matter for extreme regret that the Government have not organised Recruiting Committees for the purpose of enlisting men in the country districts, where it is well known there are thousands who could with advantage to themselves, if they were willing, take up the duties devolving upon them as citizens of the Union. . . ." Whatever view may be held of the attitude of the Randfontein group towards their men, it cannot be denied that there is much to be said for the argument quoted above. The recruiting campaign is now over, and it is unlikely that the mines or power stations will lose many more men. The thanks of the country, however, are due to those directors and managements who have risked a big reduction of efficiency and profits by releasing as many volunteers as possible.

RAND GEOLOGY AND THE INSTITUTION OF MINING AND METALLURGY.

It is understood that Dr. Mellor has in preparation a paper on the Geology of the Witwatersrand, to be read before the Institution of Mining and Metallurgy at a not distant date. No one, of course, is more competent to deal with the subject, and it is greatly to be hoped that a discussion of the economic aspect may result from the reading of the paper, which may throw useful light upon the important problem of the persistence of profitable gold values in depth. As is well known, Dr. Mellor is an upholder of the theory of sedimentary deposition as regards the origin of the gold in the banket zones. There are other geologists of standing who hold similar views; for example, Professor Schwarz, of Grahamstown, Dr. Gregory, and others, while on the other side are many of considerable reputation who maintain the view that the gold has been introduced into the "reef" by the processes which are responsible for the occurrence of gold in lodes and veins. From the purely economical standpoint, much depends upon the accuracy of one or other of these theories, and a carefully-prepared discussion of the whole question should elicit a fund of information which should be most useful to the mining industry of the Rand. If, for example, it could be proved that the auriferous contents of the banket were derived from placer deposits and distributed broadcast over the whole area of the Witwatersrand system, in the way that has been suggested by Dr. Mellor, we should be able to assure ourselves with regard to the permanence of the ore to an unlimited depth along the dip. If the source of the gold that is found at the Vaal River and around Klerksdorp and Heidelberg was a vast placer region to the north, and not a group of erratic fissures and dykes within the Witwatersrand area itself, the possible continuity of workable ore wherever the Main Reef zone has been laid down, would be a matter, more or less, of certainty. The conditions pertaining to such a mode of deposition would be susceptible of investigation, and development would be a more systematic process by far than it could ever be under the uncertain conditions which are associated with hydrothermal sources of origin. The reading of such a paper as that which Dr. Mellor will doubtless present to the Institution of Mining and Metallurgy would afford an excellent opportunity for a review of all the work that has so far been done on the economic side of Rand geology as contrasted with the purely stratigraphic aspect of the subject. In this connection the name of Professor Young suggests itself first of all, as that of one who has a large amount of important evidence to bring forward. There is a vast fund of information available, no doubt, but it needs collecting and publishing in some useful and compact form. If those who can contribute data to the discussion could be induced by the Institution to make their contributions as complete and precise as possible with the view to such a symposium as we have indicated, an excellent opportunity of dealing thoroughly with the subject will not be lost. If, on the other hand, the necessary interest in the question cannot be aroused and maintained we shall have to regret a similar state of things to that which resulted from the somewhat casual discussion of Mr. T. A. Rickard's thought-provoking paper upon "The Persistence of Ore in Depth." Here was an excellent occasion for a full expression of opinion and fairly exhaustive supply of essential data concerning a most important economic problem. A good deal was said about it in the usual technical society sort of way, but a great deal more still remains to be said, and probably will be, at odd times; but the great occasion will have gone and the new information will lose some of its interest and value. This is, of course, the fate of most questions which fall to be considered by scientific institutions whose members are busy people, and are scattered far and wide over the face of the earth. Sometimes, however, a subject is sufficiently attractive to invite special effort, and not a few papers read before the Institution of Mining and Metallurgy have been of this happy kind. A little official pronouncement beforehand may sometimes help, and we think that if the prospect of discussing the origin of the gold in the banket were notified to the members of the Institution and others whose opinions would be valued, it would be possible to make more of Dr. Mellor's paper than an ordinary opportunity for commonplace observations.

BRITISH TRADE WITH SOUTH AFRICA.

In another part of this issue we print some extracts from a report on the trade position in South Africa, by Mr. H. E. Gauntlett, who is acting as H.M. Trade Commissioner for the Union now that Sir Sothern Holland has joined the Home Staff of the Board of Trade. A perusal of this illuminating report, which comprises over 100 pages, will repay manufacturers or exporters. The very much greater extent to which British firms have taken advantage of the organisation of H.M. Trade Commissioner's Office since the war began proves, to Mr. Gauntlett's mind, that one of the most apparent failings of the British manufacturer lies in deferring his efforts until the position is critical, instead of taking early steps to prevent the crisis. German trade was as worthy of capture years ago. In this connection some pointed remarks are contained in the Report as to the necessity for catering for the exact needs of the market. The British manufacturer makes a mistake if he sees no good or immediate reason for reducing the high quality of his output, or varying his standards, to meet the demand of a new market which is not educated up to purchasing a superior article. When in August last year Germany's trade campaign was brought to a stop by the outbreak of war, H.M. Trade Commissioner assured the Chambers of Commerce throughout South Africa that British manufacturers were making concerted and unprecedented efforts to capture in the South African market the trade which hitherto had gone to Germany and Austria; and that these efforts comprised not merely improved organisation but the manufacture of goods practically identical with those to which the market has become accustomed. The Board of Trade has been giving British manufacturers an opportunity of inspecting samples of German and Austrian goods which have succeeded in such markets. The question arises then: Will British manufacturers stand by the Commissioner's assurances by seizing the first opportunity of suiting their output to this market's requirements, and thus show their appreciation of the practical assistance which has, in this connection, been given ungrudgingly to British trade by certain South African firms? Germany's exports to the Union in 1913 amounted to £3,500,000. This is obviously worth adding to the figures of any country in a position to manufacture the goods. The American pre-eminence in labour-saving method—which goes far to counterbalance Germany's cheap labour—is enabling the United States to reap a rich reward at this juncture. Mr. Gauntlett's view is that the American share in South African trade is mainly limited by her lack of direct steamship communication. Mr. Gauntlett emphasises the point that, in allowing the South African market to be controlled increasingly by foreign suppliers of "cheap" lines, British manufacturers will be adding to the strength of their competitors, which strength may be in due course diverted to opposing the position now held by British firms in the markets of the United Kingdom, the Continent, and elsewhere.

THE OLIPHANTS RIVER MICA BELT.

[By W. T. Hallimond, M.I.M.M., M.I.M.E.]

So little is known of the mica-bearing country which has now been brought within easy reach of Johannesburg by the joining of the Selati Railway with the Pietersburg-Messina line at Zookmakaar, that a few notes of a five months' experience in the Mica Belt, south-east of Leydsdorp, may be of some interest to readers. *Geographical.*—Travelling by rail from Komatipoort to Zookmakaar or Messina, you run into the Mica Belt practically at the Oliphants River, and the railway continues through it, passing Mica Siding, about three miles north of the river for a distance of another eight or nine miles. Mica Siding is 143 miles from Komatipoort, and about 200 from Delagoa Bay. *Topographical.*—The country in the Oliphants River district is thickly wooded, undulating, with here and there a prominent kopje or isolated hill relieving the otherwise unbroken stretches of bushveld. There are very few of the tributaries of the Oliphants River which are continuously running streams. There is one very fine stream, however, the Maksetsi, which enters the Oliphants just above or west of the railway bridge over the river, away from which water is scarce in the winter season. There is a fairly passable road from Mica Siding to Leydsdorp; but my advice is never to travel, whether by motor or wagon without a spade, a saw, and an axe. A road was cut through the bush a few years ago as far east as Palabora, but it is so little used by wheeled traffic that the tree roots have shot out again and the road, especially when the grass is long, can now scarcely be recognised. *Geological and Mineralogical.*—The Mica Belt strikes almost due east and west. The pegmatites in which the payable mica is found, traverse and intrude themselves into the older rocks of Gneiss and Mica schist, in most peculiar fashion, as will be seen from one or two photographs which accompany these notes, and which are characteristic of the mica-bearing pegmatites. Whatever the origin of the pegmatatic veins, sheets, or masses—and it is a matter of extreme difficulty to solve, owing to the intense metamorphosism which the older rocks have been subjected to—it is in these pegmatites that the mica is found. The mica is of the muscovite class, and is developed in crystals of varying sizes, from small spangles up to sizes which are of high economic value. Very little systematic prospecting has been carried out by the numerous syndicates and individuals who have spent their money in the neighbourhood, and the whole of the work so far carried out has been of a guess-work nature, without any heed to the strike or trend of the mica veins, which are so well marked and easily traced from east to west. There are many mica veins running parallel to each other and differing very greatly in the quality and nature of the mineral. There is a green mica which is found in thick veins and huge pockets, but with this class there is a very large proportion of unmarketable, soft mica, the small quantity resulting after splitting and grading being altogether unprofitable, though of excellent quality; being quite clean and flexible and very free from cracks. There is also a brown mica, which though often brittle and lined, in some cases is of excellent quality, free of all flaws and lines, and when split is beautifully clean and elastic. Then there is a very good class of mica which is spotted and stained. Many people have condemned this class without investigation on account of what they thought was metallic staining. This has now been finally disproved, and samples of this class of muscovite sold in London brought even better prices than Indian mica, and was specially bought for electric work. The mica veins can be easily followed by observing the outcropping pegmatite, but it is only by systematic prospecting on the lines of strike that the payable mineral

M. S.—Mica Schist.
P.—Mica-bearing Pegmatite.

M.S.—Mica Schist.
P.—Pegmatite intending above.

Opening a mica quarry.

X.—Mica vein.
P.—Pegmatite.

Natives quarrying, with boy in foreground holding two large "books" of muscovite mica.

P.—Pegmatite.
M.—Mica.

will be discovered. Owing to the undulating nature of the country underground mining will be unnecessary as quarrying can be carried on from the hill sides; this method of working being not only cheaper, but enables the workmen to obtain the mica in much better condition than would be the case by underground stoping methods. *General Remarks.*—Although the work with which the writer was connected was confined to certain areas, he is fully aware that towards the east and on the northern area of the Mica Belt, good deposits of commercial muscovite exist. The ground is nearly all Government land, and large areas have been allowed to lapse through prospectors only having pegged for an immediate deal and not with any intention of working. The price of good electric mica, of 4 in. by 1½ in. or over, averages 5s. per lb. or £500 per ton of 2,000 lbs., so that with economical quarrying and careful splitting, grading and cutting of the mineral, there is a field in the Low Country where capital can be profitably invested, and a fairly quick return be looked for.

THE POSITION OF SOUTH AFRICAN TUNGSTEN & MOLYBDENUM

Scheelite and Wolframite in Urgent Demand—Molybdenum Outlook Discouraging.

WITH regard to these two minerals, for which the European war has created an unprecedented demand, the local position is as follows:—

1. *Tungsten.*—The Department of Mines has been in communication with the Minister of Munitions, who stated that the mineral is urgently needed, and that the ore (scheelite, or wolframite) should contain not less than 70 per cent. of tungstic acid (WO_3), and that the price payable would be 55s. per unit, less 1 per cent. delivered *ex* Warehouse, Liverpool or London; also that all contracts would be dealt with by the official broker, Watson & Co., K30, Exchange Buildings, Liverpool

2. Wolframite is found with the tin ore occurring at Kuils River, in the vicinity of the Cape Peninsula; but not in workable quantity. Scheelite is more widely distributed.

3. Along the Southern Tin-Belt, from the Bush Tins at Enkeldoorn, to Stavoren and Mutua Fides and beyond, scheelite has been found and often in quantities which, at present prices, should be payable. Its presence has also been noted in the Rooiberg area and in the Oshoek and Swaziland Tin Fields; some favourable specimens have also been found near Leydsdorp.

4. As locally-produced scheelite could not be finally dressed with the plant in possession of the owners, the Department of Mines enquired whether the Munitions Office would purchase concentrates, and on what basis, asking for a scale of prices for varying percentages of tungstic acid, penalties for tin, and charges for assaying, concentrating and smelting.

A reply has been received, asking that a sample of one ton of the concentrates should be sent to London for experimental purposes, when a price can be fixed. In the meantime the reply states no value can be given or scale fixed, as the concentrate is considerably below the required standard and contains rather a high percentage of tin and other impurities. The sample required has been forwarded, and here for the moment the matter rests. It is, of course, impracticable for a mineral to be discovered, mined, concentrated and finally dressed to a high degree of purity at such a short notice as we have had with regard to this, but should it prove commercially profitable to export the hand-picked or roughly dressed scheelite to England for final treatment, quite a considerable quantity of ore may be expected to be discovered and exported.

Molybdenite.—With regard to this metal the Mines Department are informed that the need for this, by the Minister of Munitions, is not urgent. The price quoted in the market lists is extremely high, but the experiment of sending home a consignment of three parcels from one of the tin mines resulted in a great disappointment, for, in the first place, the assay value of each parcel was returned by the home smelters as only about 50 per cent. of the value as estimated by the Bank Assayers on this side; and, secondly, the other charges and deductions were so great, that the shipment, instead of bringing in a profit, which was estimated at over £100, resulted in a dead loss of £36. Discouraging, however, as this is, it should not be taken as final, for anyone who remembers the treatment accorded to the first shipments of tin from this country by the smelters in England will recollect that it was exactly similar, with the ultimate result that all the tin ore produced from Africa is now consigned to the Straits Settlements. Consigners of gold concentrates to the English markets seem also to invariably meet with the same results, for, at least, their first shipments; it is, therefore, still possible to hope that, notwithstanding the failure of the first consignment, it may in time be possible to create an export of this mineral.

The Engineer in War.

It is being demonstrated that warfare is no longer a display of spectacular heroism, accompanied by a grand fanfare of trumpets, but is largely a question of engineering, one way or another. The use of engineer troops is little understood by the layman, to whom the diversity of engineering features required by an army is astonishing. Their duties, as outlined in an official bulletin from the office of the Chief of Staff, Washington (quoted by the new York *Engineering and Mining Journal*), are to apply engineering science to the emergencies of modern warfare in order to protect and assist troops, to améliorate the conditions under which they are serving and to facilitate locomotion and communication. In the performance of these duties, engineers are trained and equipped to supplement or amplify, by scientific measures, the efforts of combatant troops in the service of reconnaissance, castrametation, fortification, sieges, demolitions, battlefield illumination, general construction, communication and such other special services of an engineering nature as may arise that are beyond the technical training of combatant troops or such as require the use of engineering implements and material not supplied to combatant troops. The reconnaissance includes both tactical and engineer reconnaissance, surveying, mapping and sketching, photography, drafting and map reproduction. The service of castrametation includes the selection, laying out and preparation of camp and the municipal and sanitary engineering incident thereto, and may include the installation, operation and maintenance of a water supply system in the case of cantonments. The service of general construction includes the location, design and construction of wharves, piers, landings, store-houses, hospitals and other such structures of general utility in the theatre of operation. The service of communication includes the construction, maintenance and repair of roads, ferries, bridges and industrial structures; the selection and preparation of fords; the construction, maintenance and operation of railways. To no branch of the engineering profession are these various requirements, either separately or as a whole, more familiar than to the mining engineer. Under average circumstances the conditions under which the military engineer operates are exactly parallel to those under which the mining engineer faces his problems—namely, isolation in the field, lack of tools and equipment, and haste—time being in both instances a most important factor.

THE VEREENIGING POWER STATION.

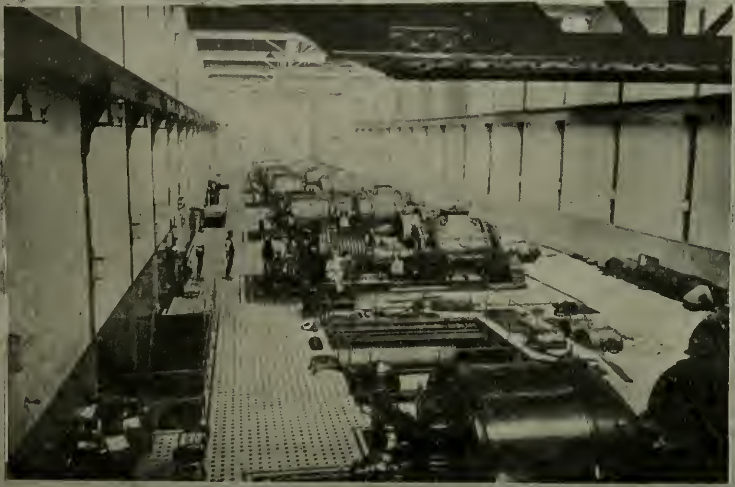
Output from 20 to 25 Million Units Monthly—Average Coal Consumption Over 1,000 Tons per Day—Water and Fuel Advantages.

THE Vereeniging Station of the Rand Mines Power Supply Company is built on the banks of the Vaal River close to the S.A.R. bridge. The factor determining the building of the Station at Vereeniging was ample cooling water for condensing and the proximity of the Cornelia Colliery of the Vereeniging Estates (Lewis & Marks). The Station was started up late in 1912, and now consists of four turbines, two of 9,600 k.w. each, and two of 12,000 k.w. each, generating at 5,000 volts, the current being stepped up to 85,000 volts by means of two A.E.G. 3-phase oil-insulated, water-cooled core transformers, and two Westinghouse transformers of generally similar design and capacity, but of shell type. Each turbine is provided with its own surface condenser of 20,800 square feet cooling surface. The circulating water is drawn from the Vaal through a brick-lined tunnel by circulating pumps placed in a pit, the discharge pipe from the condenser delivering the water into another tunnel running under the basement and taking advantage of the full syphon. The amount of water circulating per hour is approximately 800,000 gallons per machine. The circulating pump is driven by a vertical steam turbine which exhausts into the intermediate stage of the main machine. The air and condensed wâter pumps are also steam turbine driven and exhaust into the main turbine. The steam generating plant consists of 20 Babcock and Wilcox Marine type water tube boilers, arranged as two boiler houses, built at right angles to the turbine houses, each boiler is of 5,920 square feet heating surface, 2,247 square feet super-heater surface, and 2,290 square feet economiser surface, and having two Babcock & Wilcox chain grate stokers of a total grate area of 252 square feet. The normal evaporation of the boilers is 33,000 lbs.; but their actual capacity is much greater than this and evaporations of over 50,000 lbs. per hour have been obtained when burning high quality Witbank Duff, and up to 46,000 lbs. per hour when burning Cornelia crushed and screened coal. Normally, 17 boilers are required to supply the four turbines with steam when running at normal full load. The Vereeniging Station sends out between 20 and 25 million units per month, and burns between 30 and 35,000 tons of coal per month. The feed pumps are all of the A.E.G. steam-driven turbine type, and exhaust into the hot wells. The circulating and air pumps are also steam-turbine-driven, and the only electrically-driven auxiliaries on the Station are the bearing, cooling and service water pumps, and the fans for providing the draft for the boilers. The draft is the Pratt system, a cold air fan delivering air about 12 to 14 in. water gauge, through a nozzle in the base of a chimney, the ejector action inducing the flow of gases through the boiler into the chimney. Coal is delivered in 40-ton hoppers, and off-loaded on outside coal staiths, which in turn deliver into a Babcock & Wilcox gravity bucket conveyor and elevator which carries the coal into the overhead bunkers from which it is automatically fed into the stoker hoppers. The ashes are tipped from the back of the grate into large ash hoppers, which in turn deliver through ash valves into cocopans, which are attached to an endless haulage and taken to an ash dump some little distance from the Power Station. The coal consumption averages something over 1,000 tons per day, and the output of the Station has reached over one million units sent out in 24 hours. The four transmission lines are carried on two lines of lattice masts, two circuits on each and join the main system at the switch-house, Robinson Central Compressor Station, where the current is stepped down to 40,000 and 20,000 volts for distribution along the Reef.

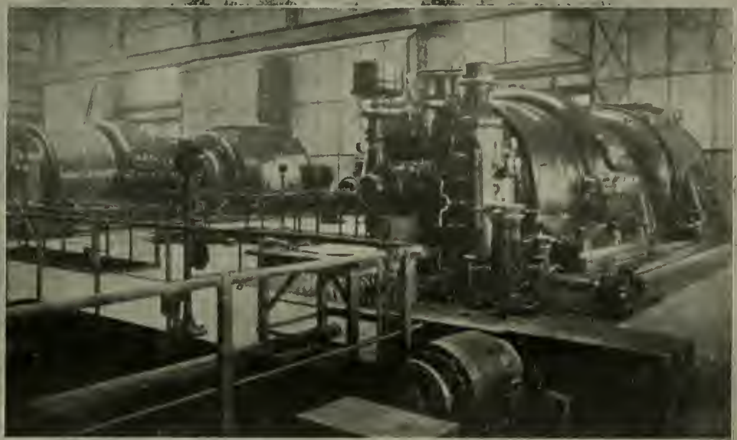
DETAILED DESCRIPTION.

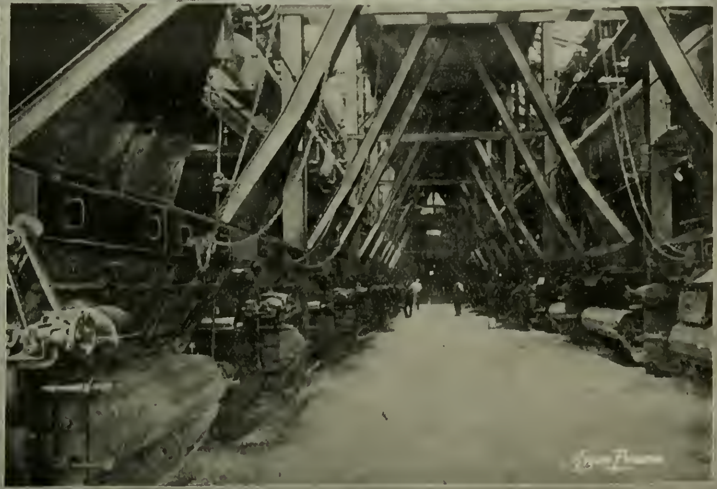
The following is a more detailed description of the Station, prepared by Mr. R. B. Canning, and read as a paper before the South African Institute of Electrical Engineers:

At all steam turbine stations there are two items which figure largely, namely, coal and water; and, given supplies of these two items, the first problem before the designer is how to handle them economically, and by this I mean with a minimum of plant and labour. I think you will all agree with me that at Vereeniging this problem has been very ably solved by the consulting engineers, and every credit is due to the main contractors and their various sub-contractors for the way in which the work has been carried out. After the necessary preliminaries had been completed and pegs driven in the then bare veld, operations were commenced on the excavations of the tunnel and pump pits for the water supply on the 1st of June, 1911, and from that date onwards steady progress was made with the work which enabled the first machine to be put in parallel with the company's distribution system on the Rand on the 15th of September, 1912. The design chosen embodies a perpendicular boiler house, i.e., rows of boilers perpendicular to the centre line of the boiler house, facilitating a complete unit straight through arrangement. One can draw a straight line through the whole station, starting from the coal bunkers and passing through the turbo-generators, transformers, switchgear and on to the overhead lines. The system of complete unit operation is so obvious, especially on so large a system of distribution as we have here on the Rand, as to need very little comment from me. It will be seen that should a generator from any cause trip out of supply, it only affects that particular portion of the distribution it is supplying, and at the same time does not interfere with the rest of the station, as all its boilers and electrical and steam driven auxiliaries are isolated and shut down simultaneously with it. The scheme adopted for the water supply consists of a tunnel driven directly underneath the works into the river with the necessary screens and sluice gates at the intake, and into this tunnel the suction pits are connected by brick lined openings. These pits are carried right up to the condenser floor level, and have two pump pits (one on either side) built so that the water at lowest river level could always be pumped, and at the same time would allow the river to rise without in any way affecting the running of the pumps which are placed 9·70m. or 32 feet below the floor level, and deliver into a bus pipe ·800 mm. diameter from which the entire water supply for condensing, cooling and boiler feed is taken. For coal handling, two steel staiths are erected over which the S.A.R. 40-ton hopper trucks are run, and from which the coal falls on the bunker floors below, directly under these floors are the belt conveyors which are fed by revolving fillers through chutes built in the concrete floors, and controlled by simplex valves. The conveyors are of the Babcock & Wilcox type, and consist of an endless chain 780 feet long with stamped steel buckets pivoted between the links which traverse the whole length of the outside bunkers and boiler house from which the coal is dropped into any one of the five compartments of the inside bunkers by tippers operated by a lever by the attendant, and are each designed for a normal capacity of 40 tons of 2,000 lbs. per hour. Each conveyor is driven through gearing by a 15 b.h.p. 3-phase totally enclosed motor with slip ring rotor running at a speed of 960 r.p.m. supplied from the boiler house auxiliary board at 525 volts. These motors are started by 3-pole trip switches and oil immersed starters which can be tripped from a number of points along the conveyor channel in cases of emergency. On each conveyor directly below the up-take to the inside bunkers is fixed a Blake Dennison weighing machine which weighs the net contents of every four buckets as they pass over the machine, and from the daily readings of which is taken the figures in connection with the running of the station. The inside bunkers are built of steel framing having reinforced concrete panels, and as before stated consist of five compartments each of which supply two boilers. Each compartment of these bunkers feeds four wrought iron chutes, which direct the coal into the hoppers over each boiler grate, and which are controlled by simplex valves. In each of the two boiler houses are erected 10 Babcock & Wilcox patent water-tube boilers of the marine type, each unit being complete with chain-grate stoker, economiser and superheater, and arranged five on either side of the house. Each boiler is built up of 43 sections which form back and front headers, the back headers carry 14, and the front 12 water tubes, each tube is 11ft. 9in. long by $2\frac{3}{4}$in. diameter inside and 3 3-16in. outside, which gives a tube thickness of 7-32in. The heating surface of the unit = 550m.^{2} or 5,920 square feet grate area, two grates 14 feet × 9 feet = 126 square feet or 252 square feet = 23·4m.^{2}. The economisers consist of 39 sections similar to the boiler, but only carry six galvanised tubes of the same dimensions, and have a heating surface of 216·6m^2 or 2.290 square feet. The superheaters consist of four steel boxes into which the U tubes are expanded, the two top boxes carry 56, and the two bottom boxes 76 tubes, and together give a heating surface of 206·15m^2 or 2,220 square feet. These boilers being the largest high pressure marine type made by Messrs. Babcock & Wilcox, have many special features; the drums are rolled out of two steel plates having only two longitudinal seams, the butt straps of which form tube plates; the drums are 4 feet 6 inches diameter, and are fitted with three safety valves, one dead weight and two spring loaded, and to the same fitting is connected a high and low water alarm. Each boiler is capable of evaporating 33,000 lbs. of water per hour under normal working conditions at a pressure of 225 lbs. per square inch, and superheating the steam up to 700 degrees F. with a draught of $1\frac{1}{4}$ in. water gauge. The stokers consist of endless chains composed of cast-iron links driven by the front drum and running on intermediate rollers, and are fitted with chain gears which give four speeds of 6 feet 3 inches, 10 feet 10 inches, 18 feet 8 inches, and 24 feet 11 inches per hour, and are driven by means of chains and sprocket wheels from a line shafting running on top of the stoker arches; this



Vereeniging Power Station, Rand Mines Power showing the Vaal River in Flood.
Interior View of Turbine House, Simmer-Pan Generating Station.





Vereeniging Power Station, Interior View.
Interior View of Typical Boiler House.

shafting is split into five sections, having flexible couplings to allow for expansion of the stoker putting same out of alignment. These shafts are driven through worm reduction gear directly connected to two 3-phase 20 h.p. squirrel cage motors. The writer had the pleasure of testing the entire boiler plant with the highest hydraulic pressure applied to any boiler in this country, which was 400 lbs. per square inch for one hour, and which they stood to the entire satisfaction of everyone concerned, including the Government. Before leaving the boiler house, a word about the induced draught plant will not be out of place. One chimney of the venturi type serves two boilers, and directly underneath these chimneys a Sirrocco fan, driven by two 75 h.p., 3-phase motors is connected through wrought-iron air tubes, the draught of which is controlled by a torpedo damper hung in the outlet of same, which gives a regulation to the draught of from 0·6 in. to 2·3 in. on the water-gauges. The boiler plant was designed to burn the coal supplied from the Vereeniging collieries, with a heat value of 5,500 calories per kilogram, or equal to 11,000 b.t.u.'s per lb., and Babcock & Wilcox gave guarantees as under, efficiency 78 per cent. at normal and 73 per cent. at half and maximum loads, with a margin of 2 per cent., subject to the running of the induced draught plant as follows: "If the actual power taken by the fan motors when measured at the terminals of same is less than 75 h.p., every 15 h.p. reduction for the double chimneys, with two boilers or multiple of that figure, would be considered as an increase in the efficiency of the boiler of half per cent. or a multiple of this value, but in no case would the normal efficiency of the boiler be less than 75 per cent." That at maximum load, and normal load variations, no water would prime over, and the steam entering the superheater would be perfectly dry. That on short circuits on the station, the priming would be limited and not interfere with the safety of operators. That at all loads with suitable feed water, no scum or other impurities could be carried over with the steam into the pipework or turbines. So far the plant has fulfilled these requirements quite satisfactorily, as the station has had several heavy shorts and load variations, from 28,000 k.w. to 5,000 k.w., through trouble on the Reef, and the boilers have dealt satisfactorily with these severe conditions. The whole of the coal handling and boiler plant was made by Messrs. Babcock & Wilcox in accordance with the company's specification and to the order of the A.E.G., Berlin, and erected by their local agents, Messrs. Reunert & Lenz. The boiler feed pumps, four in number, are situated in the basement of the turbine house or condenser cellar, and arranged one on either side of the centre line of the boiler houses. These pumps are of the A.E.G. turbine driven type, and are designed for a normal hourly output of 100 cubic meters, equivalent to 220,000 lbs. of water per hour, against a working pressure of 225 lbs. per square inch. The turbines are of the one wheel one stage type, designed for working at 225 lbs. per square inch pressure of superheated steam, at a temperature of 700 degrees F.: the throttle valve is operated and regulated by the delivery pressure, and the turbine is therefore automatically controlled according to the load demanded on the pump, which maintains a constant pressure. The pump casing and impeller are of cast bronze and the shaft of nickel steel running in special metal bearings fitted with ring oilers, at a speed of 6,000 r.p.m. The suction and delivery are each 6 inches diameter. cast on the pump casing, which can be turned round on its seating to connect to at any angle. Each pump connects direct to one of the four hot wells beneath the boiler house firing floor. into which the air pumps discharge, and on the delivery side connects to a breeches piece. so that they can feed into either the common or independent feed ranges, which consist of 6 inch seamless steel piping, with the necessary branches and valves running directly over the four boiler rows. The valves are all arranged so that they can be operated from the floor level through geared shafting. These feed ranges, when completed, were tested to a hydraulic pressure of 350 lbs. per square inch for half hour, and stood same satisfactorily. The delivery to each boiler row or into the common feed range is measured by Venturi meters made by Messrs. George Kent, Ltd., arranged for a maximum registration of 110 with a combined counter and indicator, which show the rate of flow in lbs. per hour. As everything in the station is reduced to k.w.. some idea of the capacity of these pumps will be apparent when it is known that each pump will feed boilers which are supplying turbines carrying 20.000 k.w.

(To be continued.)

POSITION AND PROSPECTS OF MESSINA COPPER.

Gross Profit, £130,526—Points from the Annual Report.

The report of the Messina (Transvaal) Development Company, Ltd., for the year ended 30th June, 1915, states that during the year 91,033 tons of ore were produced and sent to the mill and sorting plant, of which 74,564 tons were milled. The production of hand-picked ore and shipping concentrates was 12,117·41 tons, averaging 39·89 per cent. of copper, and of matte 872·03 tons, averaging 57 per cent. of copper, making a total of 12,989·44 tons, assaying 41 per cent. The ore reserves were estimated at 30th June, 1915, in terms of long tons of unsorted ore—practically proved ore 131,700 tons of 6·6 per cent. copper, and prospective ore (in the developed area) 43,700 tons of 3·7 per cent. copper. This estimate is exclusive of prospective ore in depth, laterally, new discoveries on Messina leases, and on Vogelzang Farm. To the east of the Messina Mine proper prospecting work on old workings to the south has disclosed promising prospects, and is producing daily a small tonnage of 7 per cent. ore. To the west at Vogelzang Farm prospecting has disclosed glance ore. Developments are also proceeding to the immediate west of the mine, where the prospects look favourable. The consignments were sold on the basis of an average price of £73 10s. for best selected per long ton of copper. The options entitling the holders to subscribe for 272,846 unissued shares of the company expired on 1st March, 1915. These options were not exercised and were not renewed. The company has therefore secured control of the whole of its unissued share capital. The Tzaneen-Zoekmakaar railway section was opened for traffic on 4th August, 1915. The completion of this section makes a direct route from the mine to Delagoa Bay of 435 miles, as against the old route, via Pretoria, of 697 miles. The company has guaranteed to the South African Government for a period of ten years the payment of any loss that may accrue on the working of the line from the Bandolier Kop-Messina section and the Bandolier Kop-Tzaneen section, the amount payable in any year not to exceed a sum equal to 4½ per cent. on £792,000, the estimated capital cost of the line and rolling stock. It is hoped that the earnings on these sections will be sufficient to cover the maximum interest of £35,640 per year. Development work and shaft sinking were suspended in August, 1914, and recommenced in April last. Owing to exceptionally heavy rains in January and February, 1915, the Zand River Pumping Station was washed away, and the rains interrupted railway communication with the mine for about six weeks, and caused a partial closing down of the plant. The securities against the loan referred to in last year's report, less 7,500 Emba Caspian shares sold during the year for £3,171, are as follows:—4,200 shares Camp Bird, Ltd.; 25,700 shares Emba Caspian Oil Company, Ltd.; 6,000 shares Edmonton Land Syndicate, Ltd.; 2,694 shares Santa Gertrudis Company, Ltd.; £770 Five per Cent. Debentures South Winnipeg, Ltd.; 105,000 shares South Winnipeg, Ltd.; £34,500 Five per Cent. Debentures St. Petersburg Land and Mortgage Company, Ltd.; 2,000 shares British Foreign and Colonial Corporation, Ltd.; 16,500 shares Alberta Land Company, Ltd.; £600 Five per Cent. Debentures Alberta Land Company, Ltd.; 3,000 shares Southern Alberta Land Company, Ltd.; £160,000 Debentures Canadian Agency, Ltd. With reference to the 105,000 shares in the South Winnipeg, Ltd., this number will be reduced to 42,000, 60 per cent. having to be surrendered to that company's debenture holders as compensation for certain modifications of their rights, in order that additional funds may be raised by prior lien charges or otherwise. In the case of the St. Petersburg Land and Mortgage Company, the assets of which consist of freehold property in Petrograd, the debenture holders' rights have been modified by postponing the payment of interest accruing during the present war, or within six months after its termination; as to one-half of such interest until 12 months, and as to the other half until 18 months after the termination of the war. After making proper allowance for depreciation of plant and machinery, the gross profit for the year is £130,526. Out of this amount £15,000 has been applied in the payment of debenture interest and £25,467 in providing for income tax and profit tax in South Africa. Of the balance remaining, namely, £90,058, £50,000 has been applied to writing down the Canadian Agency, Ltd. (in liquidation), loan account, £8,000 in writing down the amount due from Messrs. Chaplin, Milne, Grenfell & Co., Ltd. (in liquidation), and £23,304 in writing off shaft and railway outlay accounts. The balance of £8,753, together with £753 brought forward, amounts to £9,517, and is carried forward.

OIL SHALES NEAR WAKKERSTROOM.

Investigation by a Technological Expert—Company with £250,000 Nominal Capital—Active Operations Contemplated.

An investigation of a kind that is more practical and reliable than is usually adopted in this country is just now being made by Dr. Blair upon the oil shales of the Winterplaats, Spruitfontein, and Pongolabush area, on the Natal border, near Wakkerstroom. Analytical tests are being made in the field, where the shale seams are in process of being opened up for the purpose, and by this means an immediate knowledge of the approximate quality of the shale is obtained, a large series of examinations are quickly made on the spot, and a good deal of time is saved. Dr. Blair is a technological expert of excellent standing, as we remarked in our notes of last week, and he has been engaged in London with the special object of having the fullest possible information concerning the economic value of some 8,500 acres or thereabouts, of oil shale bearing ground, of which the options are held by the Union Oil Company of South Africa, Ltd. We are informed that the company has no connection with the Consolidated Oil Fields of South Africa, Ltd., now in liquidation, except in so far as it has taken over certain assets formerly held by the latter concern. The nominal capital of the Union Company is £250,000, of which £150,000 is allocated as working capital. The chairman is Sir George Kekewich, K.C.B., D.C.L. Various reports have been made upon the properties, by Mr. Cunningham Craig, among others, who speaks of them in very favourable terms. In his report to the Government of the Union, Mr. Craig did not appear to be highly impressed with the possibilities of the area, but practically no work had been done upon the farms at that date, and only a casual inspection of the ground was possible. After that date the shale seams were opened up to some extent, and, upon later and fuller evidence being placed in his hands, Mr. Craig was able to make a report which has encouraged the Union Oil Company to prosecute further investigations with considerable vigour. We learn that Dr. Blair's tests have shown that there are no less than four separate workable shale seams, the yield of which is generally well over 20 gallons of oil per ton, which was the figure quoted by the vendor as an average minimum over a large tonnage.

Future Operations.

The contour of the surface of the farms is well adapted to cheap working, the seams cropping out on the slopes of hilly ground, and dipping at low angles. The existence of a good seam of coal adjacent to the shales is a factor of some value in this connection. The nearest railway connection would be at Wakkerstroom, a distance of about 17 miles from the farms, to which point a branch line runs from Volksrust on the main line to Natal. Following upon Dr. Blair's report, it is proposed to begin active operations as soon as possible. Mr. Cunningham Craig has estimated that a profit of over £100,000 per annum may be obtained from the treatment of 300 tons of this shale per diem; in another later estimate the profit is put at between £80,000 and £90,000 on the same scale of operations, but it is doubtless difficult to make close calculations at the moment in view of the unsettled economic conditions which prevail. The development and working of these Natal shales should give an impetus to the opening up of similar occurrences elsewhere in the Union, particularly in Natal, where oil shales of useful working dimensions have been largely developed.

British Standardisation Rules for Electrical Machinery.

Report No. 72 issued by the Engineering Standards Committee consists of the British Standardisation Rules for Electrical Machinery and supersedes Report No. 36, published in August, 1907. These rules, which do not apply to traction motors, are divided into 20 sections dealing with types of machines, classes of rating, maximum cooling air temperature, measurement of temperature, embedded temperature detectors, limits of both temperature and temperature rise, mechanical and stalling requirements, dielectric tests, transformer terminal marking, etc. On all essential points the American and British rating of electrical machinery are in practical agreement. Attention is drawn to the fact that a single rating has been adopted and the equivalent of the overload previously specified has been included in this single rating. A value for the maximum cooling air temperature has also been adopted. Formerly an average cooling air temperature was specified, but for the purpose of establishing a permissible temperature rise in a standard machine in order never to exceed the standard temperature limits, the maximum cooling air temperature has to be considered and the Committee has adopted 40 deg. C. as the value. Full information is given in regard to temperature tests, and the methods to be adopted for the measurement of the temperature are also specified. In certain specific cases a thermometer measurement alone is specified; in some instances in which the resistance method would be applicable a thermometer alone may be employed, but with 5 deg. C. reduction in the maximum temperature. The use of embedded temperature detectors is recognised for large machines. A comprehensive section deals with dielectric tests and for large machines an extra-high-pressure test has been specified to minimise the risk of breakdown on service. Useful information to be given with the enquiry or when ordering machinery forms a section, and a note is included calling the attention of purchasers to the desirability of specifying in a certain definite manner the rating of a turbo-generator in order to avoid the possibility of confusion in export orders. The report, the price of which is 10s. 11d., post free, may be obtained direct from the offices of the Committee, 28, Victoria Street, Westminster, S.W., and is published for the Committee by Messrs. Crosby Lockwood & Son., 7, Stationers' Hall Court, London, E.C.

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TRADE CONDITIONS IN SOUTH AFRICA.

Authoritative Review by Trade Commissioner of the Position as Affected by the War.

Mr. H. E. Gauntlett, who is in charge of the office of H.M. Trade Commissioner for South Africa, has written a highly interesting report on the trade of the Union (and Rhodesia) for the year 1914. This has just been issued by the Board of Trade,* and below we summarise the portions of it which concern the electrical manufacturer and contractor. By separating the trade returns for the months preceding the war from those for August to December, and making a comparison with the corresponding periods respectively of 1913, it is evident that the trade of the country up to the time of its outbreak was below normal. The reasons for this are, in their order of increasing importance:—Drought (especially in the Orange Free State Province); slump in the ostrich feather industry; the aftermath of the January strike. But the ill-effects of these adverse factors continued, and to them must, of course, be added the two other chief causes of loss of trade, viz.: The European war and the rebellion in South Africa. The rebellion produced throughout the whole country a feeling of insecurity, and merchants (who were, because of the European war, already sufficiently nervous about adding to their stocks the normal quantities ordered in the past) refrained from indenting to the extent for which they otherwise were prepared. It will be less easy for merchants to recover the trade that might have been done but for the rebellion, than it would have been for them to have maintained the trade that was being done before the local unrest arose. For these reasons, therefore, I do not anticipate that trade in the immediate future will be much greater than it was during the closing months of 1914. Although the great dependence of the Union upon its mineral production may in certain circumstances prove an economic weakness, the greatness of its mineral wealth has been, in existing abnormal conditions, an important factor in preventing a far more serious crisis than the country was called upon to face. The percental decreases in imports are smaller in the case of electrical material and miscellaneous machinery than in almost any other class of goods, owing to their close connection with the mining industry. Nevertheless, the drop in the imports of electrical material is disappointing. During the first eight months of the year it had increased by £73,000. The import trade of the last four months altered this amount to a loss of £17,600 on the imports of 1913. The comparative figures are interesting:—

1914 Compared with the Same Period of 1913.

	First 8 months.	Last 4 months.	Total for the year.
Machinery	+ £73,000	– £90,600	– £17,600
Wires and cable ...	– 29,500	– 27,000	– 56,500
Fittings and posts ...	– 8,000	– 24,000	– 32,000
Telegraph and telephone material	– 1,000	– 2,500	– 3,500

Union Government Imports.—From the British exporter's point of view, the Railways and Harbours Department is by far the most important spending department of the Union Government. The department postponed considerable expenditure which was planned for 1914, including £43,000 on electric cranes at Table Bay. Restriction of Government expenditure on imports is to be faced in 1915, and a decrease may be looked for in expenditure on the establishment and maintenance of general public works. This must of necessity have a detrimental effect on trade generally.

Future Trade.—Although there is need for care on the part of business men, the present depression is mainly artificial. The country has a great recuperative capacity, and cannot help rising in prosperity, probably soon after the difficulties of the immediate present disappear. For one thing, the possibilities of South Africa as a meat-producing and exporting country have hardly yet been realised; when they are, ostrich farmers, many of whom are now growing lucerne, will realise that the ostrich feather slump of 1913-1914 was not an unmixed evil. Lack of capital for industrial purposes generally is a drawback which may not soon be overcome, although there is still a considerable amount of money in the Union that could profitably be employed in helping the country forward. The balance due at the end of last year to depositors in the Post Office Savings Bank was £6,300,000. If South Africa avoids the difficulties due to the careless investment of capital, the overburdening of stores with stock, and too heavy immediate borrowing, there is room only for optimism, and there is no adequate reason why the subsequent prosperity of the country should not be ensured, or why British firms should not secure a great share in the increasing import trade that must accompany its progress.

Capture of German Trade.—At the commencement of the European war, the "Capture of German Trade" appealed not as a mere phrase to British manufacturers. In Dominion markets, also, this ideal gripped the imagination of the "man in the street" more than that of the importer. The latter recognised that practical difficulties, not evident to the consumer, would appear as soon as the war was over, since the ideal thus expressed would, of necessity, strike at one of the main principles of commercial ethics, namely, buying in the cheapest market. Cheap trade is a matter upon which I wish at this point to make myself perfectly clear. It is admitted that a certain quantity of trash comes into South Africa, and is bought by natives and "poor whites" often under serious misapprehension. These are not the cheap products referred to when I use this word; what is meant is a cheap grade of a quality compatible with (and sometimes in advance of) its low price—either goods which, in the better qualities, meet the needs of a white population, or those which are used almost solely by natives, but are intrinsically worth the low price paid. No manufacturer needs to be told of the great success that has followed German efforts to cater for this class of trade.

Reasons of German Success.—To account for this success there are many reasons which are difficult to classify, since they are closely inter-related. Finance enters very largely into the matter. Subsidies are known to have been granted by the German Government by means of exceptionally low transport rates upon certain goods for export, and, in addition, there are German trusts, or rings, whose object is the establishment of a strong position in the world's markets, achieved by means of the many advantages incidental to such combines. One advantage the combines gain is in their oversea organisation. Instead of, say, half-a-dozen travellers being appointed by as many firms to push their several interests in oversea markets, *in competition with one another*, the same number of men are appointed, but work together in the interests of the one combine. This staff is often controlled by a manager in the oversea market, through whom every order passes to the home organisation. It is easy to realise the greater efficiency made possible oversea by this method of working; the value of personal supervision of travellers by a competent head cannot be over-estimated. At this point it is necessary to refer to one detail practically unknown to British firms who are represented by an agent in the South African market. German combines, and many German firms, send by each mail to their agent or agent-manager a list of orders executed during the week, showing, amongst others, the following particulars:—

$$\left.\begin{array}{l}\text{(a) Works or f.o.b. cost; and}\\ \text{(b) Price accepted by agent.}\end{array}\right\} \text{(b)} - \text{(a)} = \text{Works profit,}$$

which enables the agent to see at once from former indents (provided that costs of production have not risen in the meanwhile) by how much he can "shade" his price, if necessary, to secure a special order. Such co-operation ensures the mutual advantage of the manufacturer and his oversea representative.

Need for Co-operation.—There are British firms who, through lack of appreciation of the benefits of co-operation, seem to grudge every cheque given to an agent, and who are not anxious, apparently, to assist him at their own immediate expense to increase his turnover for them; it is not to be wondered at if such agents, in time, fail to do their best. This mutual policy of getting as much as possible for as little as possible is, of course, fatal to the interests of both parties. British manufacturers have no right to expect success in the South African market unless they are prepared to believe that their agents, importing firms, and others in a good position to judge, are fully aware of the difficulties to be found in the market, and of its most intimate needs.

Supply the Goods Wanted.—I have laid stress elsewhere upon the vital need for the manufacture by British firms of the goods to which the market is accustomed. Having made clear that the "cheap" lines are not necessarily trashy goods, but merely cheaper grades of lines in many cases already manufactured by British firms, one must repeat that the mainstay of the South African market is goods that meet the requirements of the native and "poor white" populations. In the higher qualities, purchased almost entirely by the European population of the large towns, British manufacturers have, on the whole, a position from which it would be difficult for foreign competitors to remove them. Nevertheless, their present position of security should not lead them into thinking that they are entirely unassailable in their superiority. It is common for one to hear that the British manufacturer is content with the trade in the better-class lines already being done satisfactorily by him, and that he cannot see that it would be to his advantage to gain a reputation for manufacturing cheap and inferior quality substitutes. The fact remains, however, that reputations in this market have, in the past decade, been built up by German firms through the exploitation of these same "cheap" goods, and many of such firms are perfectly capable of turning out the better-quality article as soon as it is demanded, or are already doing so. I am convinced that unless British firms make strenuous efforts to capture this "cheap" trade from Germany at this opportune moment, they will not only find that it will be secured by other countries, or that Germany herself will retain it, but they will be affording their competitors an opportunity to undermine their position in the better-class articles. The statistics of the past few years clearly show that the United Kingdom has lost trade in what may be termed the competitive articles, and is barely maintaining her percental position even in articles which have been regarded as practically British monopolies.

The Danger of Neglect.—Some British firms may find that the whole of their output can be placed satisfactorily within the United Kingdom, in Europe, or in other oversea markets, without their troubling about South Africa, whose requirements, it is true, may not be in lines of the exact quality which they now manufacture. In such case they may be justified in leaving South Africa alone; it is worth while, however, for them to consider the fact that, in allowing the South African market to be controlled increasingly by foreign suppliers of "cheap" lines, they will thus be adding to the strength of their competitors, which, in due course, may be diverted to opposing the position now held by British firms in the markets of the United Kingdom, the Continent, and elsewhere. I cannot come to any other conclusion than that, for the sake of their own security of position in the future, it is worth while now to oppose foreign competition which meets us in *any* market. South African importers are more sympathetic towards the British manufacturer than they have been for many years. That sympathy will, however, last no longer than the success of the British manufacturer in supplying the needs of the South African market in competition with foreign factories. United States firms have put forward strong efforts through their representatives in this market to capture some of Germany's past trade. Whatever of this trade these firms can capture will strengthen them in their future dealings with South Africa, perhaps at our expense. This is, therefore, a further reason why British firms should capture as much of Germany's trade with South Africa as possible.

Catalogues and Representation.—In the Bureau established in connection with the office of H.M. Trade Commissioner there are about 1,500 catalogues of British firms on file. The bulk of these deal with machinery, although those covering smaller every-day requirements are in greater demand. There is some excuse for omitting prices, etc., from the former, but not from the latter. Yet firms constantly write: "Is there any opening for our goods in your market? Catalogues are enclosed," without prices, discounts, weights, etc.! The extent of local demand is not, in the great majority of cases, governed so much by the article itself (on account of its being in universal use) as by its price; moreover, its price in the United Kingdom is often only a poor guide to its cost to the importer in South Africa. I venture, therefore, once again to impress upon British firms the need for furnishing H.M. Trade Commissioners with the fullest possible information in this regard. If it is necessary, by all means produce special oversea catalogues. If the trade is worth getting it is worth trouble; if the trouble and expense are too much for the British firm, the foreign firm thinks differently and profits accordingly. One is glad to say that British firms are becoming more alive to the need for representation, and are finding the benefit. One could detail cases, from actual experience, in which British firms have refused to take official advice on this question, and have emphasised their intention of trading direct or through London export houses. In not a few cases, however, as a result of the energy and activity of prospective agents whose interest I have aroused, orders have been sent to the United Kingdom, and have proved to the firms concerned that direct representation is practicable and satisfactory. Consequently, the United Kingdom firms have abandoned their opposition to direct representation, have appointed an agent at my suggestion, and have expressed themselves highly satisfied with the result. I want to emphasise the advisability of British firms keeping H.M. Trade Commissioner posted both as to the appointment of South African representatives and as to any change they may make in their representation.

(To be continued.)

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NOVEMBER OUTPUT: GROUP RETURNS.

Rand Mines Group.

The following are the results of crushing operations of subsidiary companies for the month of November:—

Company	No. of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton.	Total Fine Ozs.	Total Estimated Profit.
Rose Deep. ...	300	7	69,300	17/ 0·7	20,106	£24,235
Geldenhuis Dp.	300	7	57,900	20/ 5·4	17,754	14,517
Nourse Mines .	260	7	57,900	19/ 7·4	16,127	10,269
Ferreira Deep .	280	7	54,430	21/ 5·9	23,457	38,977
Crown Mines ..	660	26	211,000	17/ 5·7	63,990	81,776
Durban Rd. D.	100	3	25,700	23/ 3·2	8,263	4,462
Tls. & averages	1900	57	476,330	18/ 9·7	119,697	£174,236

Nourse Mines, Ltd.—Decreased profit mainly due to drop in grade.

The following are the results of crushing operations of Central Mining Companies for the month of November:—

Company.	No. of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton.	Total Fine Ozs.	Total Estimated Profit.
Modder B.	*96	6	44,800	16/ 3·2	22,370	£56,589
New Modder ..	180	7	52,000	17/ 3·6	25,031	59,119
City Deep	†154	9	61,000	19/11·9	29,191	60,440
Village Deep ..	180	7	52,200	18/ 6·7	17,781	25,521
Village Main R	160	4	7,800	56/ 1·5	2,848	‡10,062
Robinson	250	6	58,000	13/ 8·1	17,961	35,047
Bantjes Cons. .	90	3	20,780	21/ 1·9	5,322	130
Tls. & averages	1110	42	296,580	18/ 6·0	120,504	£226,784

‡ Loss.

* Includes 16 Nissen stamps.

† Includes 4 Nissen stamps.

Village Main Reef.—The repairs in main hoisting shaft are still proceeding. It is hoped they will be completed by the middle of December.

Ferreira Deep.—Reduced profit due to decrease in tonnage milled and increased expenditure No. 2 shaft.

Crown Mines.—The costs show an increase of 1s. 3·6d. per ton, due to a large increase in the native labour force and considerable additional expenditure on excess development.

Goerz Group.

Results of operations of the producing mines of this group for the month of November:—

Company	Stamps.	Tons Crushed.	Total Revenue.	Revenue per ton
Geduld Proprietary ...	60	26,200	£42,540	32/ 6
May Consolidated	100	14,000	11,314	16/ 2
Modder Deep Levels ...	60	34,450	63,277	36/ 9
Princess Estate	60	23,000	28,793	25/ 0
Totals	280	97,650	£145,924	—

Company.	Costs.		Profit.*	
	Total.	Per Ton.	Total.	Per Ton
Geduld Proprietary	£28,536	21/10	£14,004	10/ 8
May Consolidated	10,233	14/ 7	1,081	1/ 7
Modder Deep Levels ...	28,122	16/ 4	35,155	20/ 5
Princess Estate	27,787	24/ 2	1,006	0/10
Totals	£94,678	—	£51,246	—

Geduld Proprietary Mines, Ltd.—Reserve gold, 4,431 ozs.
*Including Sundry Revenue.

Albu Group.

The following information is officially supplied regarding the November operations of the producing companies of the group:—

Company.	Stamps.	Tons Crushed.	Total Cost.
Aurora West	80	12,200	£13,465
Meyer and Charlton	75	14,469	13,560
New Goch	120	29,850	21,000
Roodepoort United	75	34,867	30,626
Van Ryn Estate...	140	38,100	27,284
West Rand Consolidated ...	100	30,750	28,887
	590	160,236	£134,822

Company.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	22/ 0·9	£15,179	£1,714
Meyer and Charlton	18/ 8·9	33,478	19,918
New Goch	14/ 0·8	28,053	7,053
Roodepoort United	17/ 6·8	34,069	· 3,433
Van Ryn Estate	14/ 3·9	46,964	19,680
West Rand Consolidated ...	18/ 9·5	39,723	10,836
		£197,466	£62,644

Aurora West.—The change over to the new incline shaft, headgear and winding engine was satisfactorily effected during the month. This work involved the suspension of milling operations for four days, with a consequent reduction in tonnage and profit.

Barnato Group.

The results of operations of the Barnato group for November are as follows:—

Mine.	Stamps.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte ...	100	57,200	£69,534
Ginsberg	80	15,635	17,472
Glencairn Main Reef ...	160	20,500	14,405
Government G.M. Areas ...	100	51,700	69,350
New Primrose	140	21,200	16,825
New Unified	60	13,750	14,193
Quest	35	3,567	2,706
Van Ryn Deep	80	43,450	82,836
Witwatersrand	215	42,400	54,882
November totals ...	970	269,402	£342,203
October totals	965	265,132	£340,899

Mine.	Total Working Costs.	Working Costs per Ton Milled.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ...	£41,496	14·509	£28,627
Ginsberg	14,041	17·961	3,552
Glencairn Main Reef ...	12,287	11·987	2,321
Government G.M. Areas...	52,463	20·295	17,253
New Primrose	13,164	12·419	[illegible]
New Unified	9,573	13·925	4,72[illegible]
Quest	2,519	14·122	[illegible]
Van Ryn Deep	38,601	17·768	45,045
Witwatersrand	31,885	15·040	24,976
November totals	£216,029	16·037	£130,590
October totals	£216,070	16·299	£129,397

Monthly Gross Profits.—January, £126,738; February, £118,382; March, £128,225; April, £128,526; May, £131,577; June, £134,592; July, £135,782; August, £136,953; September, £130,527; October, £129,397; November, £130,590.

Neumann Group.

The following are particulars of the results achieved by the crushing companies of this group during last month, and officially supplied, viz.:—

	TONS.	YIELD.	PROFIT.
Witwatersrand Deep ...	44,400	£54,803	£16,631
Wolhuter	34,450	42,744	13,951
Consolidated Main Reef .	28,470	42,474	14,312
Main Reef West	25,830	28,081	4,193
Knight Central	29,100	31,508	4,401
Total for group ...		£199,613	£53,488

Consolidated Gold Fields Group.

The following are the particulars in regard to the outputs and profits for the mouth of November, 1915, of the undermentioned companies of the Consolidated Gold Fields group:—

Company.	No. of Stamps.	Tube Mills.	Tons Crushed.	Gold declared. Fine Ozs.	Total Profit.
Simmer and Jack ...	320	7	66,100	18,270	£28,566
Robinson Deep ...	170	10	58,600	18,905	26,314
Knights Deep	400	11	107,000	19,322	15,189
Simmer Deep	220	10	66,400	13,166	3,145
Jupiter	80	5	20,400	5,216	2,468
Sub-Nigel	30	2	7,480	3,313	3,042
Totals	1220	45	325,980	78,192	£78,724

The sundry revenue included in the above total declared profit is as under:—Simmer and Jack, £1,500; Robinson Deep, £416; Knights Deep, £170; Simmer Deep, £161; Jupiter, £1,517; Sub-Nigel, £81; total, £3,848.

Reserve Gold:—Simmer and Jack, 5,080 ozs.; Robinson Deep, 2,230 ozs.; Knights Deep, 2,573 ozs.; Simmer Deep, nil; Jupiter, 300 ozs.; Sub-Nigel, 1,185 ozs.

Robinson Group.

Subjoined are the results of the mines of the Robinson Group:—Langlaagte Estate: Tons milled, 50,038; total yield, 13,776 fine ozs.; estimated profit, £13,503. Randfontein Central: Tons milled, 213,647; total yield, 61,114 fine ounces; estimated profit, £56,856.

East Rand Proprietary Mines.

The following are the results of last month's operations at the East Rand Proprietary Mines: 820 stamps milled 187,700 tons: 54,126 ounces fine gold recovered, valued at £224,603, including 307 ounces valued at £1,275 recovered from the treatment of the accumulated slime. Profit for the month, £53,046, including £622 profit from treatment of the accumulated slime. Decrease in profit due to smaller tonnage and to provision of approximately £2,000 to cover additional monthly cost of insurance and freight in connection with realisation of gold.

Transvaal G.M. Estates.

The following are the particulars of the output of the Transvaal Gold Mining Estates for the month of November: Central Mines: Tons crushed, 11,300, yielding 5,656·002 fine ozs. Elandsdrift mine: Tons crushed, 800, yielding 769·677 fine ozs. Vaalhoek mine: Tons crushed, 1,555, yielding, 526·783 fine ozs. Estimated value of month's output, £28,868; estimated profit for the month, £11,333.

Brakpan Mines.

The following information is officially supplied in regard to the November, 1915, output of the Brakpan Mines, Ltd.: Stamps working, 140; running time, 28 days; ore crushed, 60,900 tons; tube mills working, 10; ore hoisted, 71,831 tons; ore from dump, nil; waste sorted, 14·12 per cent.; fine gold declared, 20,871·87 ozs.; value declared, £87,862; equal to 28s. 10·25d. per ton milled; working costs, £55,532; equal to 18s. 2·84d. per ton milled; working profit, £32,330; equal to 10s. 7·41d. per ton milled.

Luipaardsvlei Estate.

During the month of November, 1915, the Luipaardsvlei Estate crushed 21,300 tons; the total profit won being £5,063.

Rooiberg Minerals.

Appended are details of the operations on the Rooiberg Minerals Development Company's property for November: Stamps, 10; days (24 hours) concentrating plant ran, 23·83; tons milled, 2,941 short tons; concentrates, 85 long tons; average assay value metallic tin, 69·12 per cent.; estimated profit, £1,966 11s. 11d.; adjustments in respect of previous shipments, nil; profit declared for the month, £1,966 11s. 11d.; net capital expenditure, £1,174 10s. 8d.; £2,431 5s. 7d. has been included in working costs for the month in respect of shaft sinking, exploration, and mine development. The average price of metallic tin on which the month's revenue has been determined is £164 7s.

Glynn's Lydenburg.

The following are the particulars of Glynn's Lydenburg output for the month of November, 1915:—Tons crushed, 4,010; yielding 1,615·085 fine ozs.; estimated value of month's output, £6,770; estimated profit for the month, £2,988.

Sheba G.M. Co.

In the month of November the Sheba mine crushed 7,717 tons, yielding 2,154 ounces, while working expenses amounted to £6,599.

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Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

The Commission for Relief in Belgium.

MR. HONNOLD'S POSITION.

To the Editor, *South African Mining Journal.*

Sir,—I very much regret that in your appreciative remarks of 2nd October on the work of the Commission for Relief in Belgium, you should have attached to me the honour of succeeding Mr. Hoover in the Chairmanship, when, as I think was stated on the inside cover page of the report from which you quote, my position is that of Director in London. Mr. Hoover is still our Chairman, and, if possible, more active than ever, being now in America for the purpose of furthering a campaign to collect clothing for the approaching winter months.—Yours, etc.,

W. L. HONNOLD.

3, London Wall Buildings,
London, 3rd November, 1915.

[The mistake was due, in the first instance, to an error in cabling.—Ed., *S.A.M.J.*]

Orders for Wire.

To the Editor, *South African Mining Journal.*

Sir,—With reference to the remarks in your commercial notes of the current issue of the *S.A. Mining Journal*, regarding American houses not booking orders for wire, I shall be glad if you will draw attention in your next issue to the fact that the Steel Company of Canada can at present book orders for every description of wire except barbed. Customers will, I am sure, pardon our shortcomings in that respect as they are due to the fact that the barbed wire output is booked up for six months ahead to the order of the British and French Governments.—I am, etc.

B. C. MYERS,
Transvaal Representative for S.A. Agents,
Steel Company of Canada.

December 6.

Munitions and Industries.

APPEAL TO MEMBERS OF THE C. M. & M. SOCIETY.

To the Editor, *South African Mining Journal.*

Sir,—As announced by the President at the last meeting, a Munitions and Industries Commission has been called together at the instance of the Government. The work of this Commission will be to develop the resources of South Africa, so as to render it less dependent upon supplies from Overseas, and thus render available for the Allies in Europe labour, material, transport, etc., which is so urgently needed for the successful prosecution of the war. Many members of this Society have ideas which, if brought forward and developed, could be used to great advantage in the initiation of local industries and manufactures. If articles of local or South African manufacture can be recommended to consumers, an important step in the right direction will have been achieved. These ideas or suggestions are needed now, and any assistance which members can give in this direction will be of great value. In submitting proposals it is requested that members will give first consideration to such as can be acted upon quickly, effectively and without need for experiment. The names of members will, of course, be identified with the information submitted to the Commission. The Chemical, Metallurgical and Mining Society is represented on the Central Committee of the Commission by the President (Mr. Jas. E. Thomas), with Mr. A. McA. Johnston (Past President), as his alternate. Mr. Thomas is also a member of the Central Executive of the Commission. Messrs. Hans Meyer and John Watson represent the Society on the General Committee of the Johannesburg Local Committee of the Commission. A special committee of the Council has been appointed to assist the representatives of the Society in their duties. As the work of this Commission is of great Imperial importance, it is hope that the members of the Society will embrace this opportunity of assisting this movement by submitting any proposals or suggestions they may have, with the utmost despatch. No idea, device or method, either in connection with supplies or materials for mines, or any other sphere of work, will be considered too simple for consideration, and should be forwarded with the fullest possible particulars or details to—Yours, etc.,

FRED. ROWLAND,
Secretary.

The Chemical, Metallurgical and Mining Society of South Africa,
3rd December, 1915.

Tanganyika Concessions.

To the Editor, *South African Mining Journal.*

Sir,—Please let me know through the medium of your columns the present position of this company. What is the present monthly production of copper and the profit? Through which port is the ore shipped, and has the war curtailed operations? The chairman of the company stated that the present yearly output was 15,000 tons and arrangements were completed to turn out 25,000 tons in 1916. In view of this statement, can you explain the present low price of the shares? Your reply will oblige.—Yours, etc.,

"TANGANYIKA."

Newlands, Capetown,
30th September, 1915.

[There is no representative of the company here to whom these questions might be put, so we print the letter in the hope that it may evoke an official explanation.—Ed., *S.A.M.J.*]

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LATEST RHODESIAN MINING NEWS.

The Rhodesian Mine Dispute—Mines and Land—New Rhodesian Co.—Rezende Output—Lonely Output.

Mr. Justice Eve, in the Chancery Division of the Royal Courts of Justice, in mail week commenced the hearing of the action, Amalgamated Properties of Rhodesia (1913), Ltd., vs., the Globe and Phoenix Gold Mining Company, Ltd., and the case is expected to last for a considerable period, possibly two or three weeks. The decision will be an important one when made, and the matter is very technical. A great deal in this important case depends upon the intent and nature of an agreement that appears to have been entered into between the two companies, the Globe and Phoenix having acquired by purchase the John Bull claims—the deep-level ground adjoining the Globe and Phoenix. Under the surface of the John Bull claims there exists continuity, on the dip, of the Discovery reef that has been followed heretofore by the Globe and Phoenix, under Rhodesian law. without any question as to right to mine the ore.

* * * *

At the annual meeting of the Crescens (Matabele) Mines and Land Company in mail week, some interesting discussion arose on the expediency of adopting a more active policy with regard to the cultivation and development of the company's large land area. Mr. Percy Lindley contended that the company during the past eighteen years, while selling a certain number of farms, had neglected to profitably cultivate its idle lands of 500,000 acres, and maintained that this locking up of unproductive land was detrimental alike to Rhodesia's progress and shareholders' interests. He emphasised the advisability of attracting as many settlers as possible to Rhodesia after the war, and recommended the appointment of a committee to confer with the directors and report to the shareholders on the best means of turning the company's land to profitable account. He reminded the meeting that, although their undertaking was formerly a mines and land company, the mines had proved failures, and they had now only to look to their lands. These, he explained, covered an area of nearly 750 square miles, and were practically a great waste. The company had not attempted to cultivate a single acre or raise a single head of cattle. And while other companies, like the Chartered Company, were active in these directions, they were asleep. Mr. H. B. Vaile, who presided, thought it would be utter waste of money at the present moment to prepare farms for settlers after the war. When the war was over, he said. the company would no doubt be able to sell a good deal of its land, and shareholders would receive ample dividends. Mr. Lindley emphasised that in eighteen years the company had halved its capital and paid only three 5 per cent. dividends. Another shareholder complained of the management expenses and suggested the directors should consider the advisability of amalgamating with a similar company in order to economise. Mr. R. Simpson, a director, agreed that population was wanted in Rhodesia, but, as regards cattle, said he had not heard of any paying ranching proposition in Rhodesia. Mr. Lindley retorted that if the individual farmer could make it pay, the company ought to be able to do likewise.

* * * *

The London and Westminster Industrial Syndicate, Ltd., was registered on October 23 as a company limited by guarantee, but having a capital divided into shares. Capital: £7,500, in 10s. shares. Objects: To carry on manufacturing, industrial, financial, commercial, mercantile, promotion and other businesses, etc., and to adopt an agreement with Rhodesian Enterprises, Ltd. Private company. The directors are to number not less than two nor more than six. The first two appointed shall be permanent. Remuneration, £100 each per annum (Chairman, £150). Solicitors: Fowler and Co., 28 Victoria Street, London, S.W.

* * * *

The following are the results of the Rezende Mines, Ltd., for the month of October: Central Section, £1,063 estimated profit; Old West Section, £661 estimated profit; total, £1,724 estimated profit.

* * * *

The following are the particulars of the output of gold from the Lonely mine for the month of October: Mill ran 676 hours; crushed, 4,750 tons; yield of fine gold, 582·576 ozs.; value, £2,448 11s. 1d.; slimes treated, 4,750 tons; yield of fine gold, 2,472·004 ozs.; value, £10,393 5s. 10d.; total recovery of fine gold, 3,034·580 ozs.; total value, £12,841 16s. 11d.; profit, £4,510 19s. 8d.

ANSWERS TO CORRESPONDENTS.

"Brakpan."—Hyde Park Hotel, Knightsbridge, London, will find him.

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THE WEEK IN THE SHAREMARKET.

Increased Volume of Business—Fluctuations at Higher Levels—Specialities Strong—Dividend Prospects.

The good November output, and the prospect of early and, in many cases, increased dividend announcements kept the market unusually busy this week in the face of some profit-taking. Government Areas proved a big feature, and attracted considerable business. City Deeps have enjoyed a further rise, and Springs Mines remain in favour, though at quotations below the best. The Modder group continue in firm demand, in view of probable increased profit distributions, and generally it may be said that the market for dividend-paying stocks is excellent. In addition to the big counters, the smaller Far East Rand stocks have enjoyed considerable activity, and have changed hands in considerable quantities at improving quotations. Daggafontein, it is said, has arranged for the necessary financing, and the prospects of the neighbouring properties are, of course, correspondingly enhanced. Tins and diamonds remain uninteresting.

	Frid. 3rd.	Sat. 4th.	Mon. 6th.	Tues. 7th.	Wed. 8th.	Thurs. 9th.
Adair-Ushers	—	—	—	0 3*	—	—
African Farms	—	6 9*	6 9*	7 0	7 0	7 0*
Apex Mines	6 3	6 0*	6 0*	5 9*	5 9*	5 6*
Aurora Wests	8 6*	8 6*	8 6*	8 0*	—	8 6*
Bantjes Cons.	4 6*	4 6*	4 6*	—	—	4 9*
Brakpan Mines	67 0*	—	67 0*	66 0ᴧ	66 6*	65 6*
Breyten Collieries	20 0*	20 0*	20 0*	20 0*	—	20 0*
Brick and Potteries	—	—	5 0*	—	5 0*	5 0*
Cinderella Cons.	—	—	—	3 0*	3 0*	3 0*
City and Suburbans	41 0*	41 9†	41 0	41 3*	42 0†	—
City Deeps	70 0	69 0*	74 0	72 6	73 0	73 6*
Cloverfield Mines	5 9*	6 0	6 4	5 9*	6 3	6 0
Clydesdale Collieries	13 0*	13 6*	13 0*	13 0*	13 0*	—
Cons. Investments	—	—	—	13 6*	13 6*	13 6*
Cons. Langlaagtes	36 6*	36 9*	36 6*	35 0*	36 9*	36 6*
Cons. Main Reefs	19 3*	19 6*	19 9	19 9*	19 9*	—
Cons. Mines Selection	12 0	12 6	13 0	—	13 0*	12 9*
Coronation Collieries	25 0*	—	—	25 0*	25 0*	—
Coronation Freeholds	—	0 2*	—	—	—	0 3*
Crown Diamonds	1 9*	1 10*	1 10*	1 10*	1 10*	2 0*
Crown Mines	60 0*	—	60 0*	60 0*	60 0*	60 0*
Crown Mines Debs.	£99*	—	—	£100*	£98*	£98*
East Rand Centrals	3 0*	3 0*	3 0*	—	3 0*	3 1*
East Rand Coals	1 3*	2 0	2 2	2 0*	2 0*	2 0*
East Rand Deeps	1 3*	1 3*	1 3*	1 3*	1 3*	1 3
East Rand Minings	—	6 6*	6 9*	6 3*	6 3*	6 6*
East Rand Props.	—	21 6*	—	22 6†	22 6†	21 6
East Rand Debentures	£84†	£82½*	—	£82*	—	—
Eastern Gold Mines	1 3*	1 3*	1 3*	1 3*	1 4	1 2*
Frank Smith Diamonds	1 4*	1 6†	1 3*	1 6†	1 4*	1 5
Geduld Props.	36 3	36 0	36 9	36 0	35 9*	35 6
General Minings	—	—	—	—	—	7 0*
Glencairns	2 0*	2 0*	2 3*	2 3*	2 3*	—
Goerz & Co.	—	—	12 6*	—	—	12 6*
Government Areas	31 6	30 6	31 3	30 3	30 0	29 0
Jupiters	7 0	6 9*	7 0	6 6*	6 8*	—
Klerksdorp Props.	—	—	—	—	1 4*	1 5*
Knight Centrals	10 6	10 7*	10 6	10 3	11 9	11 2
Knights Deeps	—	—	—	—	25 0†	25 0†
Lace Props.	4 3	4 3	4 6	4 0	4 0*	4 1*
Luipaardsvlei Estates	—	8 6†	8 0†	8 0†	—	—
Lydenburg Farms	6 10*	6 6*	6 6*	6 6*	6 4	6 1*
Main Reef Wests	7 0†	—	—	6 5	5 5	6 0*
Meyer and Charltons	107 6*	107 6*	107 5*	—	107 5*	107 6*
Middelvlei Estates	—	1 3*	1 3*	1 3*	1 4*	1 4*
Modderfontein B.	125 0	122 6*	122 6*	120 0*	119 0*	119 0*
Modder Deep Levels	115 0	116 6	115 6*	113 0*	115 0	113 0*
New Boksburgs	1 0*	1 0	1 0*	1 0*	1 0*	1 0*
New Eland Diamonds	7 0*	8 0*	8 0*	8 0*	8 0*	8 0*
New Era Cons.	7 9	7 9*	8 0	7 9	—	7 3*
New Geduld Deeps	3 3	3 3	3 3*	3 3	3 0*	3 1*
New Kleinfonteins	26 0*	25 9	26 3	26 0	26 6	26 3
New Modderfonteins	308 9*	305 0*	305 6*	305 0	308 9ᴧ	305 0*
New Primrose	—	—	—	—	—	12 0†
New Rietfonteins	0 3*	0 3*	0 4*	0 3*	0 4*	0 3*
New Unifieds	—	15 0*	—	15 6*	—	—
Nourse Mines	—	16 6*	16 6*	—	16 6*	16 6*
Pretoria Cements	45 0*	45 0	—	—	—	45 0*
Princess Estates	3 0*	3 0*	3 0*	3 0*	3 0*	3 0*
Rand Collieries	2 0*	2 0*	2 0*	2 0*	2 0*	2 3*
Rand Klips	4 8	4 9	5 7	5 4	5 11	5 9*
Rand Nucleus	1 4*	1 6†	1 4*	1 4*	1 4*	1 4*
Randfontein Deeps	3 3*	3 2*	3 6†	3 0*	3 0*	3 6†
Randfontein Estates	13 6*	13 0	13 0*	13 0	13 0*	13 3*
Robinson Deeps	21 0*	—	21 0*	21 6*	22 0*	22 6
Rooiberg Minerals	14 6*	15 0	15 0*	15 0*	15 0*	15 0*
Roodepoort Uniteds	4 3	—	4 0*	4 0*	4 0*	—
Shebas	1 6*	1 6*	1 6*	1 6*	1 6*	—
Simmer Deeps	2 0	—	2 0*	1 9*	1 6*	1 8*
S.A. Breweries	—	32 0†	—	—	—	—
S.A. Lands	2 11	2 10*	2 11*	3 0	3 0*	3 8*
Springs Mines	33 0	36 9	37 6	36 6	36 6*	35 0
Sub Nigels	10 0*	10 6	11 0	10 9*	11 0	10 9*
Transvaal Coal Trust	46 0	46 6	48 6	46 0*	46 9*	46 0
Transvaal Lands	12 0*	11 9*	12 0*	12 0*	12 0*	—
Transvaal G.M. Estates	26 3*	26 3*	26 3*	26 3*	26 3*	26 6*
Tudors	—	2 0†	—	2 0†	—	—
Van Dyks	—	—	—	0 6*	—	1 0†
Van Ryn Deeps	58 3	58 0	58 3	57 3	58 6	58 3
Village Deeps	34 0*	—	35 0*	35 0*	35 0*	35 0*
Vogel. Cons. Deeps	0 8*	0 7*	0 7*	0 6*	0 6*	0 6*
West Rand Cons.	8 3*	8 6*	8 6*	9 0†	—	8 6*
Western Rand Estates	—	—	1 0*	—	1 0*	1 0*
Witwatersrands	57 0	59 0†	57 6*	58 6†	58 6*	—
Witwatersrand Deeps	27 0	28 0†	28 0†	—	27 9†	28 0†
Wolhuters	10 3	10 0*	10 0	9 3*	10 0	9 9*
Zaaiplaats Tins	11 0	10 6	10 6	9 9	9 0*	9 0

* Buyers. † Sellers. ᴧ Odd lots.

Manicaland Gold Output

The mineral output of the territory of the Companhia de Moçambique (Manicaland) for the month of October, 1915, was as follows:—Reef: Mill: Gold won (fine), 180 ozs. 1 dwt. 18 grs.; tons milled, 370½; value, £746 8s. 5d. Concentrates (estimated): Gold (fine), 4 ozs.; tons, 2; value, £8 7s. 6d. Cyanide: Gold recovered (fine), 68 ozs. 16 dwts. 4 grs.; tons, 605. value, £285 4s. 6d. (Also contains silver and lead, estimated value £12 6s. 8d.) Alluvial: Gold won (fine), 344 ozs. 7 dwts; cubic metres dredged, 38,672; value, £1,427 9s. 4d.

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Business Postponed to Recruiting—American Goods Blocked at New York—Timber and Mining Material; Tendency to Advance—Motor Cars for Military.

The Commercial Exchange members have been more occupied during the week with the recruiting campaign rather than business, so much so that one morning after the buyers' requisitions had been dealt with, the tables and chairs were removed to the sides of the hall and an impromptu recruiting meeting held. Several good speakers were forthcoming and excellent enthusiastic speeches were delivered. The matter was not left there; these men of business are evidently men of action, as an excellent scheme was devised to do something for the dependents of the men joining the forces, who are at present members or authorised clerks on the floor of the Exchange. The general response as regards monetary affairs was excellent, as many guaranteed so much per month, but so far the unattached or single members have not come up to anticipations as regards the all important matter of joining. On this particular subject, it often happened during the remainder of the week that one heard strong comments about certain people coming forward, and certain others not coming forward for enlistment. Another important matter discussed in the Exchange is that of the American trade with South Africa. A gentleman recently returned from New York states that there is half a mile of the quays closely packed with goods destined for South Africa, and he saw some miles of loaded trucks also containing goods for this Continent, simply awaiting shipping. A manager of a leading United States indent house was interviewed on this subject, and he stated that although his advices did not give the reason for so much goods awaiting shipment, yet he presumed it was on account of the divergence of shipping to the Mediterranean, which he thought was only a temporary matter. His firm had not accepted any positive orders in Johannesburg since the 8th of November unless they cabled and had confirmation by cable from New York. It was also mentioned that America had recognised the importance of the South African markets, hence the glut of goods on the New York wharves awaiting shipment. The fact was further alluded to that not only was our importance recognised but the shippers were careful to send the best goods here, as they had an eye to the future of retaining the major portion of the trade after the war, when normal conditions supervene. Another very important topic touched upon was that as American traders realised the importance of the South African commercial affairs, it may lead to the American financiers taking a hand in assisting with their immense surplus wealth the exploitation of this country's huge mineral resources as well as securing tracts of country suitable for cattle ranches. We have been anticipating something of the kind for many years past, and particularly after Mr. Hays Hammond, the mining engineer, returned to America to tell them of South Africa's great mining possibilities. The near future may supply the golden answer.

Timber and Building Material.

There is no quotable difference in the price of timber, deals, ceiling and floorings, but the tendency is on the up grade. The Johannesburg stocks are fair, but the yards are selling from supplies bought some time ago. At present there are very few shipments on the water and no freights are expected direct from the Baltic ports for a long time to come. However, suppose freights were available, it would cost from 1½d. to 2d. per foot extra to land deals in Johannesburg, if they were purchased at the present ruling quotations oversea, therefore it would not be a surprise if long deals are quoted here at a shilling per foot before many months are over. Cement is still scarce in Johannesburg, but not perhaps quite such an acute shortage as experienced last month, but it is difficult to obtain quantities. The position is relieved by the demand having fallen off somewhat, which is usual at this season of the year. The builders' hardware, baths and sanitary ware people have, however, had a fair demand lately, as many jobs are in the finishing stages for those contracts due to be finished by the end of the year. The demand for bricks is rather better than the average for this season of the year: it is more especially for work in Johannesburg proper and the immediate suburbs.

Iron, Steel, Galvanised Goods

Steel plates have risen recently and the standard list has been altered accordingly. However, business in this line is so dull at the present time that the advance has made little or no difference. A large parcel of galvanised corrugated iron changed hands on Wednesday at current rates, simply because it was a large parcel, as a fraction higher was asked. There was also a demand for wire nails, which were obtained at normal rates, although there was a disposition to obtain a trifle more. The fact is that on account of the cable advices from London there is a tendency to advance all iron and hardware goods, but nothing very definite has occurred on this side.

Paints, Leads, Oils, etc.

A cable was received here on Thursday stating that white lead had advanced another 20s. per ton in London, which is the third advance of a similar amount during the past fortnight. The price here is 54s. per 100 lbs., and 60s. is talked about from the beginning of the year. It is already selling at 60s. in the smaller inland towns, and 56s. at Delagoa Bay. Raw linseed oil has risen 2s. 6d. per 5 gallon case, but boiled oil remains the same at the higher level of values. Business is rather on the easier sile, as few new contracts are in evidence and nothing much is expected before the turn of the year.

Second-hand Materials and Agricultural.

A portable engine and a couple of windmills were sold for farming purposes, and there is a good enquiry for all kinds of piping for irrigation uses. It is said that the Boer farmers are coming more into line with their European neighbours and purchasing the latest class and best of cultivating machinery. To this end much encouragement is given by the competition amongst the responsible firms located here from most parts of the world, most of whom go in for the easy term purchase system to anything like decent marks. There is still an excellent demand for small batteries for the Lydenburg-Pietersburg district, and several prospecting parties for gold are arranging to leave here at the beginning of the year, one more particularly for an alluvial proposition in the low country. Nevertheless, although quiet progress is in evidence in the direction indicated, there has been a check through the recent recruiting campaign, which is only natural, considering such a number of men has joined in Johannesburg and the Reef.

Motor Cars for Military.

The question has often been asked as to whether the German East military expedition will give a fillip to the motor industry in Johannesburg. A motor representative states that little or nothing can be expected by us, because there are plenty of motor cars at Roberts Heights, that were used in German West, and already a large number of mechanics are repairing and furbishing them up in readiness for German East. As regards the motor oils and spirits, these will naturally be purchased at the coast.

Revised Price List.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d. upwards (local, do., 14s. 6d. upwards), angle, 17s. 6d. to 18s. 6d. per 100 lbs.; mild steel bar, 2¾d. lb.; drill, 4¾d. lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8d. to 8¼d., 11 ft., 8¾d., 12 ft. 9d.; 26 gauge, 6 ft. to 8 ft. 7d.; 9 ft. 7¼d., 10 ft. 7⅜d.; flat galvanised, 18 to 24 gauge 28s. 6d.; 26 gauge 28s. 6d. to 29s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d. to 9½d.; over, 9¾d. to 10d. (Oregon, 9⅜d.); flooring, 4½ x ⅞ and 6 x ⅞, 4⅜d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 6d. per cub. ft.; Oregon, 4s. 2d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 24s., boiled, 24s. per 5 galls.; white lead, 52s. 6d. to 54s. per 100 lbs.; turps., 46s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 19s. 6d. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 26s., do., 3/22, 22s.; tubing, 12s. 6d. to 15s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. 6d. per 100; P.O. insulators 18s.; motors, 3 h.p., about £30 new.

Major Dr. Macneillie and Mr. Raine have been added to the Select Committee on working of Miners' Phthisis Acts.

The Board of Trade has appointed Mr. Wickham, the present Imperial Trade Commissioner for New Zealand, to succeed Sir Sothern Holland as Trade Commissioner for South Africa.

S.A. Institute of Electrical Engineers.

The next ordinary general meeting of the South African Institute of Electrical Engineers will be held in the Lecture Theatre, S.A. School of Mines Building, Eloff Street, Johannesburg, on Tuesday evening, the 14th inst., immediately after the special general meeting, which commences at eight o'clock.

Swaziland Tin.

The following are the particulars of this company's output for the month of October last:—Concentrate recovered, 32·491 long tons; estimated profit, taking the price of tin at £168 10s. per ton, £1,334; to which must be added £444, (being adjustments in respect of previous shipments); total, £1,778.

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MINE SURVEYOR'S
by Class, Private Tuition and Correspondence
SOME 1914 RESULTS:—
MANAGERS - - - January and May - - - ALL Passed.
ELEC. ENGINEERS - February - - - - 60% ,,
MECH. ENGINEERS - June (Kimberly Centre) - - ALL ,,
MINE OVERSEERS - - - - - - Practically ALL ,,
NEARLY 200 SUCCESSES. St. James' Mansions, Eloff Street.

The Sakalava Madagascar Proprietary Oil.

The secretary writes: "We have this day received the following cable from our field manager, Mr. G. M. Robinson, viz.:—'No. 3 Well, 1,800 ft. deep, cased 1,730 ft. formation red clay.' This bed of clay has now been proved for a distance of 70 ft., and is, therefore, of sufficient thickness to effectively seal any oil accumulations which may be contained below."

Zaaiplaats Tin in November.

The results for the Zaaiplaats Tin Mining Company, Ltd., for the month of November, 1915, are as follows:—Days ran, 30; ore milled, 2,471 short tons; residues retreated, 2,248 short tons; concentrates won, 55 long tons; average value of concentrates, 70 per cent. M.T.; estimated profit for the month, excluding Government Taxes on profits, £975 9s.; deduct adjustments in respect of estimated values of previous shipments, £372 6s. 9d.; profit declared for the month, £603 2s. 3d.; capital expenditure, nil. Profit for the month has been calculated on the basis of tin at £162 per ton.

Specimen copies of the *South African Mining Journal* can be had from our Agents, Argus South African Newspapers, Ltd., Byron House, 82-85, Fleet Street, London, E.C.

WRIGHT'S ROPES.

The Week's Meetings.

ZAAIPLAATS TIN CO.

ANNUAL MEETING.

Position of the Mine.

The seventh annual meeting of the Zaaiplaats Tin Mining Company was held at the head offices, Pretoria, on December 6th. Sir Thos. K. Murray presided, and there was a share representation of 120,000.

The Chairman, in moving the adoption of the accounts and report of the directors, said:—Gentlemen.—The reports of the directors and the manager, as well as the statements of accounts to July 31, 1915, are before you for your adoption. The year under review has been one of great anxiety, and, through circumstances beyond our control, the most unprofitable in the history of the company. To begin with, you will remember that at the outbreak of war the London Metal Exchange was closed down, and your company was consequently unable to dispose of its outputs. Later the rebellion followed, and the operations of the company were further hampered. From the reports before you it will be seen that for five months out of the year milling operations were partially suspended, while during the months of August, September and October practically no production whatever took place, the expenditure during these months amounting to over £7,000. I would, therefore, ask shareholders to bear these points in mind when comparing the results with previous years. I now propose, as is the usual custom, to deal first with the accounts, secondly with the operations at the mine, and finally with the present position of your company. The net profit for the year, after paying Government taxes, etc., amounted to £24,631, as compared with a net profit of £53,648, from which, however, must be deducted income-tax amounting to £3,213, for the previous year. This reduced profit is almost entirely due to the reduced output, amounting to over 500 tons of concentrates. From the expenditure side it will be seen that the total working expenditure is nearly £21,000 less than the expenditure for the previous year, while the cost per ton treated is 27s. 10d. Although this latter figure is 2s. 2d. higher than the cost per ton treated during the previous year, it must be borne in mind that realisation charges, owing to the war, are accountable for 2s. of this difference. I think you will agree that our costs are very satisfactory, especially considering the abnormal state of affairs we have passed through. A reference to the accounts will also show that no capital expenditure has been incurred during the year. At the last general meeting I reported that your directors had created a reserve fund, and that an amount of £7,000 had been set aside for this purpose. During the year under review the necessity for carrying out a more vigorous policy of exploration and prospecting was considered necessary, and an amount of £1,000 was accordingly withdrawn from the reserve fund for this work. The amount is only lent to the general funds, and will be returned to the reserve fund as soon as the work being carried out produces sufficient revenue. Your directors intend to increase the reserve fund as soon as the finances permit, in order to further strengthen the financial position of the company.

Revenue and Dividends

Turning for a moment to the revenue side it will be seen that the net revenue from concentrates won amounts to £73,075, which is roughly £50,000 less than the previous year. The average price obtained per ton of metal was just under £166 or £2 per ton less than the price realised for the year ended the 31st of July, 1914. I think the company has done exceedingly well in the realisation of its outputs. Dividends paid during the year amounted to £21,000, equal to 35 per cent., which is just half the amount paid during the previous year, and, when we consider the many disturbing events I think we should feel very satisfied with this result of the year's working. You will be asked to confirm the action of the directors in paying this dividend. I referred last year to the question of income tax and stated that the inequitable incidence of the law had been represented to the Minister of Finance with a view to the company being granted exemption under the Income Tax Act. These representations were unsuccessful. Your directors then decided to bring the matter to the notice of Parliament. Letters were addressed to each member of the House of Assembly pointing out the injustice of the tax on the company and asking them, in the event of a new Income Tax Act being put before Parliament, to use their endeavours to secure for the company exemption from the tax. Although representations were made in the House Parliament was at that time not prepared to allow anything which would mean a reduction in revenue to go through, and the steps we took thus proved abortive. At some future date, when affairs are in a more settled state, your directors intend to again bring the matter before Parliament, and I trust with more success. Since we last met together the company has continued to ship its concentrates to England for realisation, and up to a month or two ago it was found that we were receiving excellent terms from the English smelters. Recently, however, our brokers have advised us that smelters have been forced to considerably increase their charges owing to the war and your directors, therefore, decided to resume business with the Straits Trading Company, Limited, at Singapone as soon as the necessary arrangements could be made, and three shipments have already been dispatched to that quarter. It is necessary for me to again refer to the trouble which has been experienced with impurities. Last year I referred to the successful introduction of the chloride roasting method, but it was found later, owing to a large increase in the amount of arsenical pyrites in the ore, that the existing roasting plant was unable to deal satisfactorily with the whole of the output. The problem of eliminating these impurities without making expensive additions to our roasting plant has occupied very considerable attention, and your manager has been untiring in his efforts to overcome the difficulty. As the flotation process seemed to have possibilities a small parcel of very poor quality concentrate was shipped to the Mineral Separation Company, Limited, London, to be experimented with by their process, but contrary to our expectations the experiment was a failure. In the meantime, however, experimental work on the separation of sulphides has been receiving very keen attention on the part of the manager and a very satisfactory new method has been devised. Treatment on a small scale gave such good results that it was decided to use the method on a larger scale. This has just been inaugurated and the results have justified the manager's optimistic anticipations as will be seen from the following analysis of a parcel recently treated in this manner:—

Before treatment: 45 per cent. tin, 10 per cent. iron, 3 per cent. lead, 1 per cent. copper, 10 per cent. arsenic, 9 per cent. sulphur. After treatment: 72.2 per cent. tin, 1.3 per cent. iron, 0.22 per cent. lead, 0.05 per cent. copper, 0.48 per cent. arsenic, 0.54 per cent. sulphur.

Your manager considers that he has now devised a method which will eventually replace roasting for the elimination of sulphide impurities from tin concentrate.

A Perennial Difficulty.

In its effort to obtain the highest efficiency your company is faced with the perennial difficulty in dealing with slime pulp. It has been realised for some time that fine classification would open the way for improvement, but, unfortunately, no satisfactory device for this purpose was available. A short time ago your company's attention was drawn to the Mauss centrifugal separator, a machine which it was claimed would eliminate the colloidal matter from slime pulp and give a crystalline product capable of easy treatment. The prospects of the machine were so great that your directors, acting on the advice of the manager, decided to take the risk of ordering an untried machine, as they felt it their duty to investigate any reasonable proposition calculated to remove the cause of the greatest losses incurred in the treatment of tin ore. I may say that if successful the entire initial cost of the device would be recovered in a few months. Turning now to the work at the mine, it will be seen from the manager's report that we have experienced some trouble with our main ore body, No. 13. It is by no means exceptional for us to pass through poor sections in that famous working. A much more serious pinch occupied our attention for many months nearly four years ago, but on that occasion we had No. 6 and other bodies to help us whereas to-day No. 13 is the only important ore producer. I am pleased to say, however, that No. 13 recovered its usual strength, and in doing so has given proof of its reamrkable and apparently unimpaired vitality. The other sections of the mine, as could only be expected in the absence of fresh discoveries, have ceased to yield large quantities of ore as formerly. The branch bodies which have been of the greatest assistance to us since the decline of the main bodies, are becoming exhausted, and we have to look for new ore bodies to replace them. It must be understood that No. 6 main body into which Nos. 5, 4, 3 and 2 merged, has never been actually lost, but since passing through the No. 6 fissure three and a half years ago the ore has on an average been very poor, practically unpayable. Whilst we have no reason to expect great things we have a most persistent body in No. 6, which is now associated with a fissure and it is not impossible that a big recovery may take place at any time. With regard to the future it is difficult and dangerous for me to make a forecast. You will be fully alive to the changeable nature of the formation. At a given date the faces may all be looking well while a week later they may all be poor in quality, and vice versa. We are trying to adopt 70 tons as the standard monthly output, but fluctuations in the output are bound to take place owing, as I have said, to variations in the grade, unless a big increase in the ore reserve position can be brought about—a matter of great difficulty unless fresh discoveries are made. The question naturally has the very serious consideration of your board. As an instance of what I have just referred to, during the last week in November a serious drop in the grade of No. 13 took place. This was immediately reflected in the output, which is reduced to 55 tons, despite the manager's endeavours to obtain the normal quantity. You will have noted a reference in our last quarterly report to the discovery of a large new ore body in the camp workings. So far this has not been of material advantage to us as the tin values are very low, but we are nevertheless very pleased with the discovery as it is our experience that ore bodies of this nature never remain permanently unpayable, and we hope to find that this one will not be an exception to the rule. With regard to the question of the possibility of our losing No. 13 in a few years' time by its passing beyond our boundaries, it is true that this eventuality has to be faced, but I am pleased to say that since the dyke was encountered the main section of the ore body has been progressing vertically downward, and as long as this continues we have no cause to fear that its life will be curtailed by passing out of our ground. Gentlemen, I think that with the manager's report deal fully with the operations at the mine and the present position of the company, but if any shareholder would like to have some further details I will ask the manager, who is present, to give you the information. Before concluding I should refer to a paragraph which appeared in our last quarterly report regarding negotiations which had taken place between the company and the Transvaal Consolidated Land and Exploration Company, respecting the sale of the mineral lease held by that company adjoining your company's ground. It was felt that this ground would be an acquisition to the company, both from a mineral point of view as well as from the point of view of affording the company additional surface area. The proposals made by the T.C.L. Company, which were acceptable to your directors, were, after considerable negotiation, withdrawn. Mr. Gilbertson continues to devote his best services to the company, and I should like to record the board's appreciation of the able and energetic manner in which he, as well as your secretary, Mr. Webber, and the staff generally, have carried out their duties during the past year. I now beg to move that the reports and accounts for the year ended 31st July, 1915 be adopted, and that the action of the directors in declaring dividend No. 16 be confirmed.

Leakage of Information.

Questions were raised by shareholders as to the directors not visiting the mine, and also as to information leaking out which permitted of dealings on the Stock Exchange before the shareholders were aware of it.

Mr. Gilbertson, manager, said "pinches" frequently occurred. If they did not it would be extraordinary. Pinches sometimes lasted a long time, and they generally had something in hand to help them out. He pointed out that the average returns were kept up in January, February, and March, but in April the ore had not improved, and the reserve had given out. They did not know exactly when they were in a pinch until they were in it for a considerable time. He reported at the end of January to the directors that the ore body was not looking well. The directors did not ask about it, because it was not unusual for him to make such a statement. It was not unusual to the end of February. The directors were only concerned with keeping the output up. When it was not possible to keep up the output he reported so, and there could be no suggestion that the directors had not been informed.

The Chairman said that some time ago the shareholders complained they were not getting sufficient information, and it was decided to issue quarterly reports. If they were to issue reports of every change they would have to issue daily reports, as it varied from day to day.

A Shareholder said some of them knew about pinches and ore values, but what they complained about was that they did not know about the particular pinch when others did.

Mr. Gilbertson said the publication of the bald fact that No. 13 had pinched would mislead shareholders. Experts in tin were extremely rare, and shareholders anxious to know about the look of the mine were very few. It did not matter how it looked one day or another, they must judge by the returns of every month or two. Enrichment to-day was no cause for optimism, because they knew impoverishment was to come.

A Shareholder said the question was the leakage of information. Suppose a shareholder knew there was a serious pinch, lasting three months or so, would not he get out of it? The manager and the chairman made too much about the changeability of the mine in a day. A mine did not pinch in a day. It would take a week, and so he thought the shareholders should get something more than they did.

Mr. Gilbertson said many a pinch took place that he did not report. It was only by experience they could know it was a serious pinch or not.

Mr. Kerr moved, Mr. Mann seconded, that the monthly report be at the disposal of the registered shareholders which was agreed to.

The report and accounts were adopted.

Mr. John E. Orr, the retiring director, was opposed for his seat on the board by Mr. M. Solomon, and on a ballot Mr. Solomon was elected.

BOARD OF EXECUTORS.

DIVIDEND OF 7½ PER CENT.

At the 26th annual ordinary general meeting of the Johannesburg Board of Executors and Trust Company, Ltd., Mr. Llewellyn Edwards presided, and there were present, either personally or by proxy, Messrs. C. H. Barclay, D. F. Gilfillan, Walter S. Webber, S. J. Wilks, G. A. Jones, H. Curtis, W. H. Thorne, Dr. J. E. Neale, the estate of the late G. C. K. Bennett, Mrs. A. Bunkell, J. T. Goldsbury (manager), Alexander Howat (secretary). There were represented 10,301 shares out of a total issued capital of 25,000.

In proposing the adoption of the balance-sheet, profit and loss accounts and directors' report, the Chairman said: The period through which we have passed since I last addressed you has been one in which it has not been possible to look for general trade expansion on safe lines. Your company has for many years been conducted on principles which connote absolute safety as their foundation, and no visions of ephemeral profits have tempted your directors to depart from those principles, their adhesion to which gives perfect security to the company's clients. Few companies can show such a position, and we draw your attention to it because we are justified in doing so. We owe to clients £22,000, and we have £25,000 immediately in hand to meet that liability. So that, no matter what happens, every man who places his business in the hands of the Johannesburg Board of Executors and Trust Co. knows that when his funds are called for they are there for the asking. Your directors take the view that this is a trust company of long standing, which has proved its merits, whose status is such that any client entrusting to it his affairs shall do so in absolute confidence that he, or those who come after him, will receive their just due, and are satisfied that their policy is one which will ultimately give cause for approval by all parties concerned. Reverting to the balance-sheet, the landed property account is unchanged. The provision of £2,128 for possible depreciation is maintained, but there is no special reason for supposing that it will be required. In the item of sundry debtors £13,237, a provision of £3,061 has likewise been continued, rather as a measure of precaution than in anticipation of actual loss. Current accounts—i.e., balances due to clients—show an increase as compared with the previous year. This is naturally a fluctuating item, which, except that on the whole it shows a steady increase in the volume of the Board's business, is of no special significance. The item which is of particular interest to us as shareholders is the profit and loss account. The gross profits for the year are £7,405, and the net profits are £2,411. Compared with the corresponding items for the previous year, respectively £8,007 and £2,906, a small decrease is apparent. But when shareholders consider that, owing to war and internal conditions, we have during the year under review been largely cut off from many sources of revenue which are normally at the company's command, the result may be regarded as good. Your directors recommend a dividend of 7½ per cent., which will absorb £1,875. The balance remaining to credit of profit and loss account will then be £5,714, which compares with a credit of £5,178 at the corresponding period of the previous year. The year under review has been a strenuous one for all of us, and your directors are pleased to bear testimony to the assiduity with which all connected with us have faced their duties, not less to the State than to the company. Whenever the call came your representatives were there, and so they are now, and will be in the days before us.

The motion was seconded by Mr. D. F. Gilfillan, and adopted unanimously.

The directors' recommendation to pay a dividend of 7½ per cent. was adopted. Mr. Walter S. Webber, the retiring director, was re-elected to the Board, and Mr. H. F. Watson and Messrs. Alex Aiken and Carter were reappointed auditors.

On the motion of Mr. Walter S. Webber, seconded by Mr. C. H. Barclay, a special vote of thanks was accorded to Mr. Goldsbury the manager, Mr. Howat, the secretary, and the staff for their services. Mr. Webber particularly referred to the fact that both the manager and the secretary, as well as other members of the staff, had applied for permission to volunteer for active military service, and such permission was not being withheld from those who could possibly be spared. So far as the manager and secretary were concerned, the directors regretted that both these gentlemen could not be spared at one time, and they had decided in favour of the last-named, who was being released as soon as possible.

The Chairman stated that he wished to associate himself entirely with these remarks, and on behalf of the board and the shareholders he conveyed to Mr. Howat their hearty good wishes for his success on active service and his safe return.

Commerce and Industries.

Basutoland Finances.

There was a deficit of £10,000 in the revenue of **Basutoland** during the year 1914-15, as compared with the previous year, which is accounted for under one item, Customs, receipts from which depend on the Customs collections in the Union of South Africa. There was a considerable shrinkage in interest due to reduction in funds available for investment. With these exceptions the figures of revenue can be regared as decidedly favourable, considering the many adverse circumstances experienced during the year. The outbreak of the European war immediately deprived Basutoland of a market for wool, since recovered, and closed the field of labour, a very popular one, previously provided by the diamond mines. In addition to this, the long-continued drought lasted well into the financial year, although fortunately it was broken in time to save the wheat crop, representing a very large money value to the Basuto, and to ensure the success of the summer crops, mealies, and Kaffir corn.

* * * *

Nine Months' Trade.

The trade returns for the nine months ended September 30 show a decrease in the total value of imports, as compared with the corresponding period of last year, of over 3¼ millions sterling. Merchandise fell by nearly 3½ millions, and Government imports 1¼ millions; but the imports of specie increased by more than 1¼ millions. During the nine months, January-September, 1914, the total specie imports amounted to only £544,435, whereas in the nine months, January-September, 1915, the figure was £1,920,222, and in September alone £334,771. On the export side the figures for gold shipments are, of course, not available. In the corresponding period of last year these shipments amounted in value to 20¼ millions sterling. Deducting this amount, the value of the remaining exports in the 1914 period was £16,692,000, compared with £11,200,971 int he 1915 period; or a difference of about 5½ millions sterling. The difference is almost entirely explained by the paralysis of the diamond industry, the consignments of diamonds in the nine months of 1914 being valued at about 5½ millions sterling, as against £491,093 in the nine months of 1915. Taking exports and imports together, the shrinkage due to the war in the value of the Union's foreign trade, leaving out of sight movements of in the value of the imports through Delagoa Bay. On the into Table Bay showed an actual increase in the period under review, while there was a drop of over 1¼ millions specie and shipments of raw gold, comes to about 10 millions sterling. It is noteworthy that the value of the imports import side the most notable increases are in wheat (£538,000 to £879,000), bags (£347,000 to £943,000), and unmanufactured leather (£130,245 to £192,603). The fall in the imports of machinery, agricultural implements, wood and timber, and other necessities of developmental work, to which we called attention a couple of months ago, is still noticeable, though there is a gratifying recovery under the head of manures and fertilisers. The progress of the wool industry is indicated by a rise in the value of the exports from £3,300,000 to £3,700,000. Ostrich feathers, which had virtually disappeared from the export list in September, 1914, accounted for £52,430 last September.

* * * *

Conditions at Zanzibar.

The city of Zanzibar, the port through which practically all of the foreign trade of the archipelago passes, has long been known to the commercial world as an asembling and distributing point of a vast territory bordering on the Indian Ocean and extending inland to the great lake region of Central Africa. But, as pointed out by Consul Perry C. Hays, of the United States, the last decade and a half has seen some notable changes in the economic development of the East African littoral and its expansive hinterland. The harbour of Mombasa-Kilindini, of British East Africa, through the building of the Uganda Railway therefrom to the shores of Victoria Nyanza, has become the chief gateway to the extensive and productive territories of the uppermost Nile. Agriculture is the only industry in the islands, and cloves and copra constitute practically the sole locally produced contribution to international trade. Of the estimated area of 645,000 acres of land in the insular dominions of the Sultan, 240,000 are cultivated. Of the latter figure 80,000 acres are in the island of Zanzibar and 160,000 acres in that of Pemba. In the former island 20,000 acres are devoted to clove culture, 30,000 acres to coconuts, and 30,000 acres to native crops; in Pemba, 40,000 acres are devoted to cloves, 15,000 acres to coconuts, and 105,000 acres to native crops. In the two islands are approximately 5½ million clove trees and 2½ million coconut trees. Of clove trees Zanzibar has about 2 million and Pemba 3½ million trees; of coconut trees Zanzibar cultivates approximately 1,700,000 and Pemba 800,000. The acreage of native crops varies greatly from year to year, as a given area may be tilled one season and then permitted to lie fallow for one year or more. The produce of native effort is consumed locally, the principal crop being the manioc root. The reclamation of lands as yet untilled and the intensive cultivation of those already under crop would vastly increase the value of the export trade in cloves and copra and thus augment the purchasing power of the people and advance the figures of the imports destined to local consumption. The chief items of importation are coal, copra, cotton goods, flour, grain, groceries, hardware, petroleum and petrol, and tobacco.

S.A.
MINING YEAR BOOK.
1915.

BY S. R. POTTER.

Vol. I.

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ZAAIPLAATS TIN MINING COMPANY, LIMITED

(INCORPORATED IN THE TRANSVAAL.)

DIRECTORS' REPORT

For the year ended 31st July, 1915.

Submitted at the Seventh Ordinary General Meeting of Shareholders, held in the Company's Offices, Norwich Buildings, Church Square, Pretoria, on Monday, the 6th December, 1915.

GENTLEMEN,—Your Directors beg to submit their Report, together with audited Statements of Account, for the year ended 31st July, 1915.

The Report of the Mine Manager is also annexed.

CAPITAL.

The Capital of your Company is £60,000, divided into 240,000 Shares of 5s. each, all issued and fully paid.

PROPERTY.

The Property of your Company is the same as stated in our last Report, namely :—

(a) 96 Discoverers' claims situated on the farm Zaaiplaats No. 1328, District Waterberg, held under Mining Lease from the Government.
(b) 18 Base Metal Claims situated on the same Farm.
(c) Certain Surface Right Grants.
(d) Certain Water Rights.

During the year under review the Company has secured an additional Water Right at a convenient situation on the Sterk River.

OPERATIONS.

The following is a summarised Statement of the year's operations, fuller details of which will be found in the Manager's Report annexed :—

Mill of 15 Stamps ran (12 hours basis)	269	days.
Ore mined	25,937	short tons.
Ore drawn from Surface Dumps	1,621	,, ,,
Waste sorted out (24.5%)	6,281	,, ,,
Ore milled	21,277	,, ,,
Residues treated	9,581	,, ,,
Alluvium treated	29,778	,, ,,
Concentrates produced	699	long tons.
Average grade of Concentrates produced	70.4%	M.T.

The quantity of Concentrates produced is about 500 tons less than the quantity produced during the previous year. This is chiefly due to the partial cessation of crushing operations from the beginning of August for a period of about four months, owing to the outbreak of war, and to the dislocation of work caused through the Rebellion. Advantage was taken during the above period to carry out certain necessary repairs to the Crushing and Milling Plant.

FINANCIAL.

The annexed Balance Sheet clearly discloses the financial position of the Company at the end of the year.

The Revenue from Tin Concentrates won amounted to £73,075 14s. 5d., while the expenditure on working account amounted to £42,935 15s. 10d. The working profit for the year was, therefore, £30,139 18s. 7d.

In addition to the foregoing revenue, a sum of £360 2s. 11d. was derived from Interest, Rents, etc., while the following additional expenditure has been incurred :—

	£	s.	d.
Income Tax for year ended 31st July, 1915	£1,489	10	0
Government Royalty on profits	2,179	17	0
Directors' Remuneration	1,375	7	0
Bonus to men on active service	321	0	7
Prospecting and Exploration Work	502	7	0
	£5,868	1	7

The net profit for the year was, therefore, £24,631 19s. 11d., which, together with £11,652 4s. 7d. brought forward from the previous year, and an amount of £3 4s. 6d. recovered for plant sold in excess of expenditure on Capital Account, has been dealt with as follows :—

	£	s.	d.
Auditors' Fees for year ended 31st July, 1914	£157	10	0
Dividend No. 16	21,000	0	0
Income Tax for year ended 31st July, 1914	3,213	3	0
Amount carried forward	11,916	16	0
	£36,287	9	0

An amount of £1,000 was appropriated from the Reserve Fund for the purpose of carrying out certain prospecting and exploration work. The Reserve Fund, therefore, now stands at £6,000.

The average price realised for the Company's output during the year was £165 18s. 3d. per ton of metal, as compared with an average of £168 for the previous year.

Practically no Capital Expenditure has been incurred during the year.

WATER SUPPLY.

The water supply has been ample for the Company's requirements, and no shortage is anticipated before the rainy season sets in.

DIVIDEND.

During the year your Directors declared Interim Dividend No. 16 of 35 per cent., equal to 1s. 9d. per share. You will be asked to confirm payment of this dividend.

The total amount paid to Shareholders since the inception of the Company amounts to £339,000, equivalent to 565% on the Capital.

DIRECTORS.

In terms of the Articles of Association, Mr. J. E. Orr retires from the Board, but is eligible, and offers himself for re-election.

AUDITOR.

You will be asked to fix the remuneration of the retiring Auditor, Mr. John Dougall, and to appoint an Auditor for the ensuing year.

THOS. K. MURRAY, Chairman.
D. M. MUNRO,
W. J. GAU,
JOHN E. ORR,
Directors.

Pretoria, 29th September, 1915.

Zaaiplaats Tin Mining Company, Limited—continued.

Balance Sheet, 31st July, 1915.

Dr.

To Capital Account ... 240,000 shares of 5s. each.		£60,000 0 0
,, Funds transferred from Appropriation Account—		
As per Balance Sheet, 31st July, 1914 ...	£67,962 14 7	
Deduct amount recovered for Plant sold—less expenditure on Fixed Assets during year ...	3 4 6	
		67,959 10 1
		127,959 10 1
,, Reserve Fund—		
As per Balance Sheet, 31st July, 1914 ...	7,000 0 0	
Less amount appropriated for Exploration and Prospecting Work	1,000 0 0	
		6,000 0 0
,, Sundry Creditors—		
Government of the Union of S.A. in respect of Royalty on Profits and Income Tax ...	3,645 16 7	
Unclaimed Dividends ...	279 3 0	
Directors' Remuneration ...	1,375 7 0	
On Open Account ...	5,433 4 9	
		10,733 11 4
,, National Bank of S.A., Ltd.— Nett Overdraft ...		1,380 15 1
,, Appropriation Account— Balance as at 31st July, 1915 ...		11,916 16 0
		£157,990 12 6

Cr.

By Property ...	£44,379 1 0
,, Buildings ...	10,711 17 3
,, Machinery, Plant and Equipment ...	60,331 3 6
,, Reservoirs, Dams and Water Service ...	4,921 7 2
,, Sterk River Pumping Scheme and Pipe Line ...	7,616 1 2
	127,959 10 1
,, Livestock and Vehicles ...	421 7 6
,, Furniture ...	337 10 0
,, Stores on hand ...	3,183 16 7
,, Sundry Debtors and Payments in advance ...	912 6 6
,, Concentrates in transit ...	19,176 1 10
,, Cash— On Fixed Deposit (*Reserve Fund per Contra*) ...	6,000 0 0
	£157,990 12 6

Working Expenditure and Revenue Account, for year ended 31st July, 1915.

EXPENDITURE.

To Mining ...	£16,123 10 3	
,, Sorting and Tramming ...	1,568 3 7	
,, Crushing, Milling and Concentrating ...	9,207 16 9	
,, Slimes Treatment ...	1,419 18 10	
,, Drying and Bagging ...	1,015 14 4	
,, Alluvial Washing ...	2,015 9 11	
,, Realisation Charges ... Transport, Railage, Cables, Freight and Oversea Handling Charges.	4,725 15 8	
,, Mine General Charges ...	4,764 9 8	
		£40,840 19 0
,, General Charges—Head and London Offices ...		2,094 16 10
		42,935 15 10
,, Balance on Working carried down ...		30,139 18 7
		£73,075 14 5

REVENUE.

By Concentrates Account— Gross value, less smelting charges ...	£73,075 14 5
	£73,075 14 5

To Bonus to Men on Active Service ...		£321 0 7
,, Prospecting and Exploration Work ...		502 7 0
,, Government Royalty—		
Amount of Royalty for year ended 31st July, 1915 ...	£2,156 6 7	
Add amount under-estimated for previous year ...	23 10 5	
		2.179 17 0
,, Income Tax— Amount of Tax for year ended 31st July, 1915 ...		1,489 10 0
,, Directors' Remuneration ...		1,375 7 0
,, Balance to Appropriation Account ...		24,631 19 11
		£30,500 1 6

By Balance brought down ...	£30,139 18 7
,, Sundry Revenue—Rent, Brokerage and Interest	360 2 11
	£30,500 1 6

Appropriation Account.

To Dividend No. 16 of 35 per cent. (paid 6th June, 1915) ...	£21,000 0 0
,, Balance to Balance Sheet ...	11,916 16 0
	£32,916 16 0

By Balance 31st July, 1914 ...		£11,652 4 7
Less Auditors' Fees for year ended 31st July, 1914 ...	£157 10 0	
Less Income Tax for year ended 31st July, 1914 ...	3.213 3 0	
		3,370 13 0
		8,281 11 7
,, Amount recovered in respect of Machinery, etc., sold ...		3 4 6
,, Balance Working Expenditure and Revenue Account ...		24,631 19 11
		£32,916 16 0

H. P. WEBBER, Secretary.

THOS. K. MURRAY, Chairman.
D. M. MUNRO, Director.

To the Shareholders,
ZAAIPLAATS TIN MINING COMPANY, LIMITED.

I have examined the Books and Accounts of the Zaaiplaats Tin Mining Company, Limited, together with the Documents and Vouchers relating thereto. I have obtained all the information and explanations required by me, and I hereby certify that in my opinion the above Balance Sheet contains the particulars required by the Company's Articles of Association, and is properly drawn up so as to exhibit a true and correct statement of the Company's affairs at 31st July, 1915, as shown by the Books and Accounts.

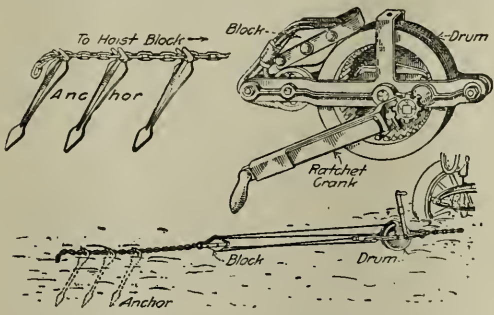
JOHN DOUGALL
(Incorporated Accountant),
Auditor.

Pretoria, 6th October, 1915.

Engineering Notes and News.

A Little Thing with a Big Pull.

An ingenious piece of mechanism devised for the automobilist to enable him to pull himself out of a hole looks as if it would be a very handy contrivance to have around a mine. The device is known as "Pull-U-Out," and is in effect a miniature chain block, and is simplicity itself. A substantial winding drum, with gears inside, engaging a small bronze gear on the end of a long ratchet crank, furnishes the pull. At the other end of the tackle is a small double block; 40 ft. of steel cable, with a capacity of 5,000 lb. is used. Two 7-ft. pieces of light-weight chain, with hooks on each end, complete the outfit. In order to furnish an anchor where there is no stump or fixed object to tie to. three light-weight steel stakes are provided with each "Pull-U-Out" outfit. These are to be set in the ground, tandem fashion, about a foot apart, leaning toward the object to be pulled—not away from it, as one would suppose. When driven in in this fashion and the chain fastened to the three stakes, it is claimed that 50 men could not pull them out with a side pull, but that when the tension is released they can be easily pulled up on the same angle at which they were driven. The manufacturers say "the device itself is clever, but these three stakes are more than clever." Underground, this little device ought to prove of immense advantage many times. The handling of big timbers in stopes would be much facilitated or the handling of timbers in a raise or winze. The handling of the sinker pump when shaft sinking, or the placing of additional lengths of water column, especially when the size is large, furnish other applications for this device. In face there are so many ways in which this device can be used to advantage around the mine, both on top and underground, that it ought quickly to become the miner's friend Its portability is as great an attraction as its pulling power. The complete outfit is sold by the Pull-U-Out Sales Co., 2018 Market Street, St. Louis, Mo., for $15. The accompanying sketch shows this promising little device.



The Pull-U-Out Device.

Petrolex Motor Fuel.

APPLICATION FOR A PATENT REFUSED.

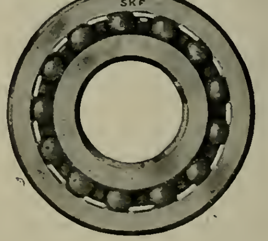
An application for letters patent for a motor fuel known as "Petrolex" and applicable for "use as an illuminant," made by Alfred Henry Finniss Wheldon, of Mount Edgecombe, and Christian August Lagesen, of Johannesburg, was heard before the Acting Attorney-General of Natal (Mr. W. S. Bigby) recently. Objections to the granting of this patent were lodged by Mr. Robert Wood, managing director of the Natalite Motor Spirit Co., Ltd. Mr. J. W. Gallwey appeared for the applicants, and Mr. Eugene Renaud for the objector. The ingredients of the fuel as enumerated were those of which the fuel known as Petrolex consisted, and which formed the subject of the applicants' alleged patent: Ethyl alcohol, 96 per cent.; methyl alcohol, 2 per cent.; pyridine, 5 per cent.; acetone, 1·40 per cent.; ethyl methyl acetone, ·10 per cent. Evidence in support of the objections to the granting of this patent was led to show that the mixture set out in applicants' specification was worthless, and failed entirely to satisfy any of the essentials for a fuel for internal combustion engines, which essentials were as follows: (a) Readily volatile to ensure easy starting, that is, a ready response to throttle opening; (b) must have a good heat of combustion, since calories meant power; (c) must on no account have any corrosive action itself, nor must any of its products of combustion have a corrosive action on the metal of the engine. Evidence was also given to show that certain engines at the Durban Agricultural Show of 1915, alleged to be running on "Petrolex," and to which placards were attached stating that "these engines are run on Petrolex," were, in fact, running on petrol, although advertised to be using the alleged new fuel. The case was fought "in camera," according to the Patent Laws of the Union, for three whole days, and the judgment for the objectors, given by Mr. W. S. Bigby, was as follows:—Having heard the objector and his witnesses, and also having taken the evidence of Mr. Jamieson called by me in terms of Section 8 of Law No. 4 of 1870, I find that the applicants are not entitled to the issue of a warrant for the granting of letters patent for the above-named invention as "an improved motor fuel." My finding is the same in connection with the application for the granting of letters patent for the said invention as an illuminant.

De Beers Annual Meeting.

The annual meeting of the De Beers Company has been fixed for December 28th next, at Kimberley, when the directors' report for the year ended June 30, 1915, will be considered.

Field Analysis: A Useful Book.

Nobody will dispute that the mining industry must continue its activity in spite of the war's effect on commerce and manufactures, and while Europe is disturbed, the search for new mining fields continues with little or no apparent abatement. McGrigor's "Field Analysis of Minerals" has been published as a valuable aid to prospectors and travellers. Its price is so low that even in times like the present it is easily within the reach of all, while the size of the book has been kept remarkably small, considering the large amount of matter it contains and its convenient arrangement. Prospectors—to whom weight of baggage is a bigger consideration even than to other members of the mining fraternity—will welcome this departure from the very bulky form assumed by most of the books offered for their use. The book is published by the Technical Bookshop, Salisbury House, London, E.C., at 3s. 6d. net, post free.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CONTENTS. PAGE

Notes and News ... 363
Topics of the Week:
South African Engineers and War Munitions ... 365
Small Holdings for Miners ... 366
Trade After the War ... 366
The Union Tin Industry in 1915 ... 367
Outlook for the Messina ... 368
Progress on Corner House Mines ... 369
Chamber of Mines' Quarterly Report ... 370
The Outlook for the Luipaardsvlei Estate ... 371
Rhodesian Section:
Latest Mining News ... 372
The November Gold Output in Detail ... 373
Medical Examination of Employees ... 374
Correspondence and Discussion: "Karoo Coal Prospects"; "Miners' Phthisis Prevention"; "Johannesburg Forest and Land Company" ... 375
Review of the Union Labour Market ... 377
The Week in the Sharemarket ... 379
The Week in the Mining Material and Engineering Trades ... 381
Engineering Notes and News ... 386
Company Meetings: Consolidated Gold Fields ... 383

Notes and News.

Dividends and Output.

The excellent Rand output for November, followed by the satisfactory dividend declarations bring another successful year of the industry to a fitting conclusion. The December output will, probably, prove another record, and the year's figures should more than fulfil expectations. The most of the Rand dividend declarations have now been announced, and next week will provide the remainder. Our usual list is postponed till then.

* * * *

C.M. & M. Society Visit Delmore.

Some fifty members of the Chemical, Metallurgical and Mining Society, with the President, Mr. Thomas, and the Secretary, Mr. Rowland, paid a visit on Wednesday to the works of the New Transvaal Chemical Company, Ltd., at Delmore. The visitors were received by Messrs. R. Goldman and G. Sonn on behalf of the board of directors, and personally conducted over the works by the manager, Mr. Smith. A most interesting afternoon was spent inspecting the multifarious departments of the company's activity. Before leaving, the visitors were formally welcomed on behalf of the company by Mr. Goldman. Mr. Thomas, the President of the Society, suitably replied. The visitors were particularly impressed with the mine-candle department of the works, from which upwards of 60 per cent. of the candles used on the mines of the Rand are produced.

* * * *

New Modder Prospects.

The special general meeting of the New Modder shareholders to sanction the share-splitting scheme will take place on January 14th next. The shares have been an improving market ever since the scheme was announced, and the dividend of 16¼ per cent. declared this week, in accordance with the promise given by the Chairman at the recent annual meeting, has given satisfaction. In this connection we may quote Mr. S. C. Black's summary of the position, as at the date of his speech at the recent annual meeting. "The position of this company," said Mr. Black, "is such that so far as one can determine, the profit value on the present developed tonnage of ore represents approximately the market value of the shares, as they stand to-day, which leaves out of account the untapped areas of over 800 reef claims. Can any other mining proposition in the world show anything to rival such a comfortable and assured position? I very much doubt it."

* * * *

War Map of German East.

We have received from the Government Printer a copy of the official war map of German East Africa, which has just been published by him. The size is 34 inches by 31 inches, in four colours; price 1s. Obtainable at the Government Printing and Stationery Offices, Pretoria, Capetown, and Maritzburg; railway bookstalls, and at the principal booksellers throughout the Union. The map is splendidly turned out, and reflects great credit on all responsible for its preparation.

* * * *

"T. and D. B." Investment.

The net profit of the Transvaal and Delagoa Bay Investment Company for the year to 31st August, 1915, was £41,487. After allowing for a dividend of 17½ per cent., absorbing £32,375, a balance of £104,559 is carried forward. The financial position is very strong, the cash assets, less sundry creditors, amounting to £113,169. The wisdom of maintaining a strong cash reserve in times like these is obvious. The "T. and D.B." Collieries produced 555,452 tons of coal, a decrease of 31,263, due to the rebellion and to military operations in South-West Africa, which at times seriously interfered with the supply of railway trucks. There is no change to record in the width of the seam or the superior quality of the coal. £9,020 was written off for depreciation, while the net capital expenditure was £2,321. At the annual meeting the other day, Mr. S. C. Black mentioned that every endeavour was being made to find new outlets oversea for Transvaal coal, and when more favourable shipping freights prevail, he looked hopefully to the expansion of the export trade. He announced that the latest trials of Transvaal coal on the Soudan railways had proved to be very satisfactory, and the cost, at the point of delivery, in comparison with Welsh coals was entirely favourable to the Transvaal product. Referring to matters contained in the general manager's report, Mr. Black called attention to the mortality rate of the native employees of the colliery. "We have usually been able to record a low rate in our compound," he said, "but 5·95 per 1,000 is surprisingly so, and I can only hope that it will be possible to maintain such exceptional figures. It is a matter reflecting great credit on all concerned; it is comparatively easy to maintain a high standard of hygiene among the white employees—due to the favourable conditions under which they live and work—but the welfare of natives demands our constant attention, considering the great difference between their previous mode of life and their employment on a mine, mostly below the surface." In this matter of native mortality the company has set an excellent example to the whole Province.

* * * *

Industrial Development.

Led by the S.A.N.U., a body of leading Johannesburg citizens have been endeavouring to stimulate the Municipality to take some steps to encourage local industries. In this connection it may be remembered that, at the recent annual meeting of the "Johnnies" Company, Mr. Gustav Imroth sounded a note as to the importance of devoting more attention to the great undeveloped natural resources of this country, so as to increase the taxable commodities of the country by the creation of other sources of wealth; not looking to Great Britain for loans, but bearing our own burdens and adjusting our own problems of revenue and expenditure. The following were some of Mr. Imroth's thoughtful remarks:—"I am inclined to think that we who are entrusted with the direction and maintenance of the output of this great gold industry are apt to consider it too exclusively, and to forget that a great Union such as South Africa cannot always live on the mining industry alone. We must broaden the bases of our production. A visit to other parts of South Africa leads one to suspect that a great section of our population can never draw its means of livelihood from the mines, as we on the spot are apt to imagine, and sometimes we may injure our own outlook and prospects by overlooking this fact. We all know that the mines are of immense value to this country; we need only look at the trade figures to realise that; but there are other sources of production than gold and diamonds. A big company like ours, which is so interested in the permanent prosperity of the towns of the Transvaal, must not become so centralised as to overlook the fact that the prosperity of a country is built up of many things and depends on many producers."

* * * *

The Diamond Position.

The De Beers, Premier, and Jagersfontein mines will resume work on a limited scale on January 1. The Diamond Syndicate has stated that not another diamond would be mined until after the close of the war. The imports of diamonds into the United States has increased of late, and it is said to be due to this persistent drawing upon stocks that has led the diamond companies to decide upon washing operations on a limited scale. The total value of precious stones (which includes pearls) into the United States from January 1 to the end of October is $15,642,000, in comparison with $17,402,000 to October 22, 1914.

* * * *

Union Steel Co.'s Contract.

In the House of Assembly last week Mr. Wilcocks asked the Minister of Finance: (1) Whether the conditions of the contract between the Railway Administration and the Union Steel Company are faithfully carried out by the Company; (2) whether the guarantee which is required from the company under the contract has been given; (3) whether all scrap iron is being taken by the company and paid for in terms of the contract; and (4) whether the company is in arrear with its payments for scrap iron, and if so (a) what is the sum in arrear, (b) what security is there for its payment, and (c) is interest being paid on it, and if so, at what rate? The Minister of Finance replied: (1) The monthly payment provided for has not always been made regularly, but otherwise the terms of the agreement have been observed; (2) yes, for £3,000; (3) the company is taking scrap in terms of the agreement, and an arrangement has been made whereby the cost of material purchased by the Administration stands as a set-off against any amounts owing by the company; (4) yes, slightly; (a) £360 at November 30, but against this certain amounts are due to the company for material supplied; (b) the bank guarantee; (c) yes, 3½ per cent. is charged on unpaid monthly instalments.

* * * *

Trading in the Protectorate.

In the House of Assembly last week Mr. Alexander asked the Prime Minister: (1) Whether permits are required to enable British subjects to enter the Protectorate of South-West Africa; (2) whether commercial and professional firms consisting of German subjects are allowed to carry on business there exactly as before the war, whereas British firms in the Union, who were not established in that territory before the war, are refused permits for their travellers and representatives; (3) whether permission has been refused to lawyers who are British subjects to enter the conquered territory, and whether in consequence British banks and other institutions there are compelled to seek legal advice from lawyers who are German subjects; (4) whether it is not the fact that in the case of residents in the conquered territory, who have incurred debts within the Union and have no assets within the Union, there is no means by which Union creditors can obtain legal redress; and (5) whether the Government is prepared to take into consideration the advisability of altering the existing state of things as soon as possible? The Minister of Finance replied: (1) Yes. (2) German firms are allowed to trade as before. No permit has been refused to any reputable Union firm either to trade in the Protectorate or to send representatives to take orders. (3) I have no information as to where British banks and other institutions in the Protectorate seek their legal advice, but as no civil courts are at present in existence there is no machinery for the admission of new legal practitioners in the territory. (4) Civil courts have not yet been established, but I know of no case of the kind referred to by the hon. member. (5) These matters have the attention of the Government.

* * * *

The "Goldfields" Meeting.

A large portion of Lord Harris's speech at the "Goldfields" meeting—reported elsewhere in this issue—was devoted to the Robinson Deep scheme, in which the Gold Fields is very greatly interested; for not only does it hold 41 per cent. of the Robinson Deep capital, but 51 per cent. of the Booysens and South Deeps. The conversion of a claim area with, so to speak, no market value into a negotiable security, in the form of shares, is a distinct advantage. The prospect is that four years from date the shares will be revenue producing; and, in certain eventualities, the life of the Robinson Deep will be indefinitely prolonged. The Gold Fields interest in the reorganised Robinson Deep capital should provide about half the amount required for the first and second preference shares dividend service for some twenty-five years at least.

* * * *

Mine Employees' Leave Regulations.

The new leave regulations agreed to by the Mines Association with the Chamber of Mines are now in force. The scheme makes the following provisions under prescribed regulations:—For underground employees: Over three years' service underground: Twenty-four working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave. Between two and three years' service underground: Eighteen working days on full pay, when such does not exceed 20s. per shift, which shall be the maximum pay during leave. Between one and two years' service underground: Twelve working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave. For surface employees: Reduction works employees —over one year's service: Fourteen working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave. Winding engine drivers: Holiday leave for this class of employee is still under consideration; in the meantime existing procedure to be followed. Other surface employees—over two years' service: Ten working days on full pay, when such pay does not exceed 20s. per shift, which shall be the maximum pay during leave. The above holiday leave is in every case subject to the attached "Regulations governing leave for employees other than officials."

* * * *

Messina. Thanks to an increased production of copper sold at higher average prices, the Messina (Transvaal) Development Company, Ltd., made a considerably larger profit in the year ended June 30 than in 1913-14. But, unfortunately, the bulk of this (namely, £58,000) has had to be employed in writing down further the old loan accounts in connection with the failure of the Canadian Agency, Ltd., and Messrs. Chaplin, Milne, Grenfell and Company, Ltd. Out of the net profit of £90,000 made by the Messina Company during the past financial year (against £45,200 for 1913-14), an additional appropriation of £23,300 has also been made for shaft and railway outlay accounts. The net result is that there is a balance of £8,754 to be carried forward, against £763 brought in. The company has never paid a dividend, and, unhappily, to add to the financial troubles which arose when it was under its former control, developments in the mine itself have recently been less favourable.

* * * *

Comparison of Crushing Tests. Some system for comparing crushing tests so as to give real information is badly needed. Many suggestions have been made, but none of them has met with universal approval. The difficulty of getting a satisfactory basis insures a welcome for every new plan. The latest is a suggestion by M. K. Rodgers, in a paper to the American Institute of Mining Engineers. According to the *Engineering and Mining Journal* of New York, the data Mr. Rodgers wants to include are these: Descriptions of the machines employed; the method and material used in foundations; the locality from which the rock or the ore was obtained and its geological, mineralogical and physical characteristics; power consumption of the machine running with no-load and with full load, the units of power being 1 h.p. per 24 hr.; the capacity of the machine in tons of 2,000 lb. per 24 hr.; the duty in tons per horse-power-day, and a careful statement of the screen analysis of both the feed and product in accordance with the proposed A.I.M.E. standard-screen scale. It is proposed that whenever a rock-crushing test is reported, all of the factors mentioned shall be given in detail. There is no doubt that Mr. Rodgers' suggestion ought to be acted upon, though it could be amplified. It does not go far enough. All operators are well aware that, aside from the factors mentioned, there are many others that have more or less influence upon results. They ought to be considered. Besides, there is not much profit in finding out what kind of ore you have by working it in a certain machine. It seems better to find out how good the machine is by testing it upon the ore to be crushed, and this process requires some unit for expressing the character of the ore itself. In other words, a unit factor must be found that will explain the character of the rock; then the work done upon it by different machines can be intelligently compared. Consequently it will be possible to select the best machine to do the required work. Unfortunately, the basis for comparison has not yet been agreed upon. Those interested in the subject are aware of the discussion, which has been occupying a prominent place in the technical press for the last three or four years, regarding the accuracy of the laws of Rittinger and Kick, one of which has been advocated by Stadler and the other by Gates. The discussion is still on. A universal standard, mathematically true, is the logical beginning, so it must be first decided which of these laws is the correct one to apply and which system of units to use. Stadler's energy-unit is advantageous if it be proved that Kick's law is true. Gates' unit, using the crushing-surface diagram, is also easily applicable and readily useful if it can be proved that the basis of his argument, which rests on Rittinger's law, is correct. In a general review of the situation, then, it may be said that while we welcome every step, no matter how small, toward standardizing test reports, the field of rock-crushing comparisons will never be complete until a permanent foundation has been laid.

TOPICS OF THE WEEK.

SOUTH AFRICAN ENGINEERS AND WAR MUNITIONS.

AT the last meeting of the South African Institution of Engineers, some interesting light was thrown on the efforts now being made by engineers in this country to "do their bit." At that meeting the President mentioned that the Government had recently appointed a Commission to go fully into the question not only of the making of munitions, but also as to whether they could not relieve the Home manufacturers by making machinery and mining material in South Africa. No less than 70 delegates from all parts of South Africa were present at the Conference, and it was decided to appoint a Central Committee of about 20 members, to sit in Johannesburg, and that the Chambers of Commerce and various engineering and scientific societies throughout South Africa should be asked to collect evidence as to what machinery and material could be made in this country. The Central Committee appointed an Executive Committee of seven, of which he (the President) was a member, and Mr. J. A. Vaughan, a past President of the Institution, had also been appointed on the Executive. The President thought that in about a month's time they would be able to get to work and help the Old Country by relieving the Home manufacturers to some extent. The President read the following letter he had received from Mr. Cullen, a member of the Institution, who is at the Ministry of Munitions in London:—"The question of making shells or ammunitions' accessories has been giving me and my colleagues in this office a great deal of thought, and, after exhausting every possibility, we have reluctantly come to the conclusion that you can do practically nothing in South Africa. The whole question must be considered from many points of view, and if shipping were normal we might be able to send you out certain raw materials, such as brass, but then articles of this sort require to be shipped out and shipped back again in the form of finished products, and with the shipping business being disorganised as much as it is already, it really could not be managed. This is only one, but it applies really to everything, as you must know. Even the only zinc mine which we have in the Transvaal—Witkop—has had to be shut down because of the lack of smelting facilities on this side. *South Africa as a whole can, however, give the Empire most excellent assistance by carrying on the gold industry to the maximum of its possibilities and growing food in the same way.* Something might be done in the production of alcohol in South Africa. You may take it that this question has been considered from every point of view, and the conclusions which I have just outlined are deliberate, and are the result of conversations which have extended now for some months. All the same, if you or any of your colleagues in the Institution can think of any practical means of rendering help, and pass them on to me, I shall be very glad to do my best to forward them." At a later stage of the proceedings, the President added that they had not gone very far in the matter of the manufacture of munitions, but a lot of useful work had been done in other directions. As far as the munition problem was concerned, they had given a great deal of consideration to the manufacture of shells, but under present conditions in South Africa it was found almost impossible to make anything larger than a 3-inch shell. It would require special machinery for such work, and if the Imperial Government were to ask them to make shells in South Africa, nothing substantial could be done under six months. With regard to hand grenades and catapults, the local Munitions Committee had been maturing a design for some time past, and the Government had placed an order with them for 2,000 grenades and six catapults. The British hand grenades cost £1 0s. 9d. each, and De Beers were making the same grenade at a cost of between 18s. and 19s. The general manager of De Beers had, however, stated that if the Government were to place an order with them for 10,000 or 12,000 grenades, they would be able to make them at a cost of about 12s. each. Catapults were also being made at a cost of £24 which could throw a grenade about 130 yards. As far as the Institution of Engineers were concerned, they were working very hard on the Government Commission, and the views of the Institution were receiving every consideration. Lists were being prepared of machinery which had been installed in different parts of the country, but he was not in a position to place anything more before the Institution at present. It is plain, however, from the little that has been revealed, that the question is being seriously faced, and that everything possible is being done in face of the many and obvious handicaps to mobilize South African engineering resources. The last word on the subject comes from Pretoria Chamber of Commerce, and is not encouraging:—

> "So far as practical work goes it can only be considered that results have been disappointing up to the present. A list of requirements of the South African Railways, and of the Pretoria Municipality, which it was considered might be manufactured locally, has been received by the Local Committee appointed by your Chamber, and steps have beene taken to ascertain from the mines and other large corporations what their requirements are. This information is at the disposal of all members of the Chamber, and has been, so far as received, sent to the few firms considered likely to be able to execute any of the requirements, but the Local Committee are of opinion that there is no possibility of making any substantial progress in the direction aimed at, at least so far as the intimated requirements are concerned, unless local iron of an even quality, at a reasonable price, is available, and until some satisfactory guarantee is forthcoming that firms laying down the plant capable of producing the articles required shall continue to receive South African orders after the war and the special pressure on Home manufacturers is over."

SMALL HOLDINGS FOR MINERS

The question of small holdings for Rand miners was revived last week in the House of Assembly. Mr. Feetham, who was a member of the Small Holdings Commission which sat two years ago to consider the best methods of developing small holdings, more especially on the Rand, did good service in reminding the House of Assembly of the importance of the problem. Many of the conditions are favourable, for wages are high, and the men only want an incentive to thrift such as small holdings would offer, to take full advantage of such opportunities. Suitable land, however, is practically closed to them. The Gold Law operates in such a way that landowners in the mining areas are at present deprived of surface rights, except as regards their own reserves. Hence, although there are large areas of suitable land for garden or farm holdings, they cannot be appropriated for agricultural purposes. The Small Holdings Commission estimated that of 95,000 morgen available, some 68,000 morgen must remain unemployed for agricultural purposes unless the law is altered. Mr. Feetham's plan would be, as a preliminary step, to have a valuation made of the surface agricultural value of the land and then buy it out for the purpose of small holdings. Another important step would be the creation of a Land Board to deal with the question of small holdings, pure and simple. Mr. Feetham's views were cordially endorsed by several Rand members. In reply, the Minister of Mines said that the Government generally approved of the objects contemplated by this motion. It was not necessary to labour the point of the advantage that would accrue from getting more agricultural development in connection with the mining industry on the Witwatersrand. The Minister dwelt upon the difficulties of superimposing an agricultural system upon a mining system. He went on to say that there were three sets of difficulties which they had to meet owing to the Witwatersrand being a mining area. The first was that the mining law of the Transvaal did not take the ownership of the land for State purposes when a farm was proclaimed. As soon as a farm was proclaimed for the purposes of the Gold Law three parties became interested: (1) The owner of the freehold of the land; (2) the owner of the mineral rights, and (3) the Government. In the three mining districts of the Rand they had 95,674 morgen of proclaimed land, in which the three parties he had mentioned were interested. Only about 60 per cent. of this ground, according to the certificates of the Government Mining Engineers, was required now, or likely to be required in a reasonable time for mining purposes. The land not required for mining purposes, 30 per cent., had as a result become merely waste. Much of this might be used for garden holdings or farm holdings, but a difficulty arose in estimating the present-day value of the reversionary rights in those lands. A second set of difficulties was in connection with the Townships Act, and a third in connection with vested rights. At the present moment there were within the three municipalities of the Witwatersrand 84 proclaimed townships and, according to the landowners interested, there were between 40,000 and 50,000 unoccupied township stands on the Rand. It stood to reason that, if they were going to create a cheaper holding, they would undoubtedly introduce a disturbing factor of considerable importance into the economic conditions of the Rand. In conclusion, Mr. Malan remarked that, as far as he could find, this report had never been seriously considered by the public on the Rand. If he were asked to say what public opinion had been created on the Rand on this question, he must confess that one knew comparatively little. He hoped they would get the formation of a healthy public opinion on this matter, which would help the Government and the House to solve the difficulties he had outlined. The Government recognised that something ought to be done. All the advantages were in that direction and, with that object in view, the Government accepted this motion, they would go into the matter very carefully, and on a future date would submit practical proposals in connection with the alteration of the law. Mr. Duncan, who followed Mr. Malan, expressed profound disappointment, and interpreted the Minister's reply as meaning that nothing whatever would be done. He promised, however, to satisfy Mr. Malan's request for some manifestation of public opinion on the question, and predicted that the Minister would have enough public opinion to make him profoundly uncomfortable until some definite action is taken. Sir Willem van Hulsteyn spoke of the difficulties inherent in the character of the land on the mining areas, most of which is very difficult to irrigate. Mr. Merriman gave a lively dissertation on small holdings in general, strongly advising the Minister to get something practical done, but also urging the importance of individual effort. On Mr. Wyndham's motion the debate was adjourned, and it is to be hoped that it will come forward prominently when the House resumes next February.

TRADE AFTER THE WAR.

In several of the London papers just now considerable space is being devoted to the urgent need that exists for securing an early statement from the Government regarding an after the war policy concerning trade. The Council of the Association of Chambers of Commerce of the United Kingdom is stated to have framed the following resolution respecting the prospect of wholesale German dumping:—

> Inasmuch as large numbers of our soldiers will return to industrial employment after the war it is necessary to look ahead in order that nothing may be allowed to occur likely to lessen their opportunity of obtaining employment and a livelihood. It is thought that Germany may pour into this country large quantities of manufactured goods, at low prices, in competition with the products of our working people, depriving our people of a market and thereby reducing employment. This Council beg to warn His Majesty's Government of such a possibility, and consider that the Government should be prepared well in advance with a considered and matured plan, to prevent unemployment caused by the action of German manufacturers, and to secure continuity of business for those who have undertaken enterprises with the hope of obtaining a portion of trade formerly done in competition with British subjects by those countries with whom we are at present at war. This Council strongly impresses upon His Majesty's Government the necessity of deciding its policy in connection with this question before the time shall have arrived when the feared mischief may have begun, shortly after the conclusion of peace and the re-opening of the markets of the world.

One of the papers states that the London Chamber of Commerce is holding a special meeting to consider the whole question of trade relations after the war between Great Britain and her Dominions and the Allies on the one side, and our enemies on the other. It is said that a prize of £1,000 will probably be offered for the best scheme of trade defence submitted to competent judges by January 1st next. The Council of the London Chamber is understood to be making further representations to the Government in favour of the more general adoption of the metric system of weights and measures, and to urge members of the Chamber to introduce the system into their own businesses without delay.

THE UNION TIN INDUSTRY IN 1915.

Comparative Production—Capital and Expenditure Statistics—Swaziland Hydraulicing Operations.

The statistics of the Mines Department relating to the tin industry of the Union during the past three years are as follows:—

	Transvaal.		Cape.		Total.	
	Tons.	Value. £	Tons.	Value. £	Tons.	Value. £
Year 1913	3,600·494	427,863	71·413	8,687	3,671·907	436,550
Year 1914	3,386·395	307,282	42·839	4,109	3,429·234	311,391
Nov., 1914, to Oct., 1915, inclusive ...	3,273·394	318,848	27·212	2,940	3,300·606	321,788

From these figures it will be seen that the production of metal has been slightly lower during the last twelve months than in the previous year, while the average price has been higher, so that the gross value has exceeded that of the year 1914. The chief producers have been the Rooiberg, Zaaiplaats and Leeuwpoort tin mines and the Swaziland alluvial workings belonging to the Swaziland Tin, Ltd. The annual meetings of three of these companies, which have recently been held, have afforded much interesting information with regard to the progress of the tin industry in the Union during a somewhat trying period.

Individual Performances.

The last annual records of the companies referred to show, *inter alia*, these details of production:—

	Date, 1915.	Mine Ore.	Accumulated Residues.	Alluvium
Rooiberg ...	30th June	26,390	10,873	—
Zaaiplaats ...	31st July	21,277	9,581	29,778
	1914			
Leeuwpoort ...	31st Dec.	44,478	—	—

The value of mill pulp and yield of concentrates was as follows:—

	Grade Ore Treated. % M T.	Concentrates Won. Long Tons.	Ave. Grade Concentrates. % M.T.	Ave. Grade Tailings. % M.T.
Rooiberg ...	2·82	1,005	69·28	0·60
Zaaiplaats ...	—	699	70·40	—
Leeuwpoort .	1·69	706	63·143	0·57

Although a fair amount of detailed information is given by the various concerns, it is obvious that no very accurate estimate can be formed of the actual performances of the dressing plants with the exception of that of the Leeuwpoort (African Farms) Tin Mines, Ltd., where there has been no treatment of accumulated middlings or slimes conjointly with that of the mine ore. At Rooiberg, for example, nearly one-third of the tonnage put through the mill and handled upon the dressing table, together with the crushed ore coming directly from the mine, has been accumulated middlings and slime which were left over some time ago for closer treatment in the new plant. For this reason one is unable to draw up a comparative statement of working cost for the purpose of showing the relative efficiency of the respective plants. Even if this were possible, it would scarcely be a fair comparison owing to the fact that the physical character of the ore from the different mines varies considerably, that of Leeuwpoort, for instance, being notable for the fineness of the cassiterite, and the necessity, therefore, for much more careful separation than would otherwise be the case. The original grade of the ore treated has also, of course, some bearing upon the question of comparative efficiency for which it would be difficult to make the requisite allowances. It is interesting, nevertheless, to note that the Leeuwpoort Company, on such a low grade of ore of the kind described, is able to keep the residue at a figure somewhat lower than that of the Rooiberg. It is admittedly still a high value to send to waste, and naturally an effort is being made, as has recently been stated in this journal with regard to Rooiberg, to make such improvements or additions to the respective dressing plants as will save as much as possible of the values that are at present beyond the limit of profitable handling. The cost per ton milled, including head office charges, was £1 7s. 0·35d.

Cost of Tin Plant.

The Rooiberg plant, which is a very elaborate and successful one of its kind, is not separately specified in the balance sheet, where property and mine equipment, less amounts written off the sum of £220,236 as at the 30th June, 1914, now stand at £180,000. The Leeuwpoort balance sheet is much more detailed, and since the property and equipment comprise, practically speaking, a new undertaking, the following items from the last statement, dated 31st December, 1914, are of some interest as indicating the amount of expenditure involved in a concern of this kind:—

Property, 3,000 morgen freehold, 1,099 morgen minerals	£144,562
Shafts	16,668
Development, prospecting and exploration ...	58,527
Machinery, plant and equipment	64,149
Headgears	565
Buildings	8,862
Permanent works	284
Capital, all issued, in £1 shares	£275,000

The mill comprises two Nissen and fifteen Californian stamps, and the ore milled during the year under review was 44,478 short tons, during a running period of 328·42 days.

Swaziland Alluvial Operations.

The operations of the Swaziland Tin, Ltd., are of exceptional interest as showing how successfully a properly designed and equipped system of sluicing can be carried out on even a low grade alluvial proposition in this country. The annual report, brought up to the 30th June of this year, shows that 961,550 cubic yards of ground were moved by means of monitors and sluiced, the water being supplied to the working faces from electrically driven pumps. As a result of the year's work 687,785 lbs. of metallic tin were won, or an average of ·715 lb. per cubic yard, at a total creek working cost of 4·81 pence per cubic yard. Taking prospecting, dressing of concentrates and sundry expenditure into account, the total cost amounted to 6·013 pence per cubic yard. The working profit for the year, after deduction of general and head office expenses and export charges, was £14,457. The issued capital of the company is £82,000 out of a total nominal capital of £100,000 in £1 shares; the property stands in the balance sheet at £61,629, and a sum of £10,843 is shown as transferred from appropriation to date on account of property and equipment in excess of the working capital provided. The proved reserves at the beginning of the year under review were estimated at 2,056,266 cubic yards, carrying an average of 1·47 lb. of metallic tin per cubic yard.

Specimen copies of the *South African Mining Journal* can be had from our Agents, Argus South African Newspapers, Ltd., Byron House, 82-85, Fleet Street, London, E.C.

OUTLOOK FOR THE MESSINA.

Unsatisfactory Mining Position—Reduced Ore Reserves—Points from Technical Reports.

Some extracts from the new directors' annual report on the Messina for the year to June 30, 1915, appeared in our last issue. The report dated August 26, 1915, made by Mr. A. F. Kuehn, a member of the Technical Committee, states that the mine "is suffering from a past over-production"; but a far more serious circumstance than this is the fact that the ore reserves in the course of a year have been cut in half, and now represent less than two years' supply for the mill capacity. At the meeting of the company a year ago the new chairman said: "For the moment development is being curtailed. . . . We have come to the conclusion that it is more important to have cash at the present time than to maintain or increase our ore reserves, and you must not think the mine is coming to an end should, at this time next year, the ore reserves be reduced; you must regard the phenomenon, should it occur, as part of a deliberate policy adopted at a time when affairs throughout the world are abnormal and when money is scarce." In view of this one would not have been at all surprised if the ore reserves had been depleted to the extent of the tonnage mined during the year; but we have a decline in the tonnage of the reserves that far exceeds the quantity of ore taken out of the mine, and, in addition, the average value of the ore reserves has declined considerably. The following table, showing the ore reserve estimates of the last five years is taken from the *Statist*:—

ORE RESERVES.

At June 30	Proved Ore Long Tons	Copper Value p.c.	Probable Ore Long Tons	Copper Value p.c.	Total proved and probable Ore Long Tons	Copper Value p.c.
1911* . . .	91,070	10	214,280	—	305,350	—
1912* . . .	151,780	10	186,600	—	338,580	—
1913* . . .	205,350	10	132,140	—	337,490	—
1914* . . .	223,210	8.75	125,000	—	348,210	—
1915† . . .	—	—	—	—	175,400(a)	5.9

* Estimates of *milling* ore reserves allowing deduction for waste sorting.

† Estimate of ore reserves before allowance for sorting (18 per cent. in 1914-15)

(a) Includes 45,700 tons of "possible" ore value 3.7 per cent. copper.

For the past year to June 30, thanks to the high price realised for the copper output, a profit was earned sufficient to enable the financial position of the company to be greatly strengthened. The quantity of ore milled for the twelve months amounted to 74,565 tons, against 52,511 tons in the previous year, and the result was that the copper contents of the concentrates and matte produced in the past year rose to 5,330 tons in comparison with 4,007 tons in 1913-14. The progress of producing operations in the past five years is shown below, the tons given being long tons in all cases:—

Year to June 30	Ore Treated Tons	Av. Grade Copper p.c.	Concentrates Produced Long Tons	Concentrates Produced Av. Assay p.c.	Matte Produced Long Tons	Matte Produced Av. Assay p.c.	Total Copper Contents Long Tons	Yield per Ton Treated p.c.
1911 . . .	16,583	10.95	2,235	50.8	—	—	113½	6.8
1912 . . .	9,238	9.0	1,037½	49.8	—	—	516¾	5.6
1913 . . .	20,179	10.14	3,126	45.8	—	—	1,473	7.3
1914 . . .	52,511	8.3	8,900	40.7	663¾	58.0	4,007	7.6
1915 . . .	74,564	—	12,117½	39.9	572	57.0	5,330	7.1

The general manager's report states that the extraction obtained in the past year showed considerable improvement, so that the decline in the yield of copper per ton of ore treated does not completely reflect the lower value of the ore mined. As regards earnings and profits, the price realised per ton of copper was about £73½ in the past year, against £68⅝ in the preceding twelve months, a factor which, combined with the larger output, materially contributed to the expansion of revenue. In addition, working costs, including 5s. per ton milled for development, and a large sum for depreciation and other charges, were reduced to 53s. 5d. in the past year, against 60s. 6d. in 1913-14. As a result of the larger output, higher price of copper, and reduced working costs, the working profit of the past year increased to £130,526, in contrast with £60,690 in the previous twelve months:—

Year to June 30	Value of Output £	Total Price Copper Realised* per Ton £	Working Costs† per Ton of Ore Treated s.	d.	Working Profit £	Working Profit per Ton of Ore s.	d.	Working Profit per Ton of Copper Output £	s.	d.	Price of Shares at end of Period s.	d.
1911 . . .	57,050	59½	66	3	2,029	2	5	1	16	0	25	0
1912 . . .	29,761	68⅛	74	7	4,708‡	—			—		18	3
1913 . . .	93,786	74 7-16	66	8	26,431	26	2	17	18	0	30	0
1914 . . .	219,752	68⅝	60	6	60,690	23	2	15	3	6	15	0
1915 . . .	329,282	73½	53	5	130,526	35	1	24	9	7	14	3

* Average price on basis of which output was realised.

† Including all expenditure except profits tax and Debenture charges.

‡ Loss. (a) Price of old £1 shares on basis of present 5s. shares.

Mr. Kuehn considers the expenditure of £17,450 on capital account to be necessary for attainment of a maximum production and efficient practice. Then the mining necessitates the adoption of a vigorous development policy and the raising of the development redemption allowance to about 10s. per ton of ore milled, providing, say, £50,000 per annum. This will have to come out of profits, as the development and shaft sinking accounts in the balance sheet already figure for £78,706, representing as much as 11s. 3d. per ton of the milling ore reserves. Finally, debenture redemption at the rate of £35,000 per annum commences from July 1, 1916. As regards the future, Mr. Kuehn estimates that by being "forced" the mine can produce 92,400 tons of 6·2 per cent. copper, against 89,500 tons of 7·3 per cent. copper in the year to June 30 last. Having regard to the ore reserve position and the development results, Mr. Kuehn concludes:—"Barring the possible find of Bonanza shoots, I look upon the undertaking as a producer of from 90,000 to 95,000 tons of ore per year for a period of eighteen months to two years, and thereafter, probably, a smaller annual rate." The company has an outstanding 6 per cent. debenture debt of £250,000, the redemption of which at the rate of £35,000 per annum commences next year, and its issued capital is £181,788, in 5s. shares.

Dynamite as Fertilizer.

In view of the steady growth of the use of dynamite for farming in South Africa, and the great interest it has evoked amongst the agricultural community in general, the following article from the October issue of *Tropical Life*, with regard to experiments in the Malay States, will prove of interest to many of our readers:—"Further results of experiments to test the value of dynamite as a fertilizer, or rather as a means of setting free the plant-foods in the soil, go to confirm what we have all along suspected of being the case. Now we are told by the *Malay Mail* that the results of experiments carried out by the Department of Agriculture out there in the use of dynamite as a fertilising agent, are shown in a table in the Director's Report for 1914 with regard to a plot of two acres, planted with rubber, blasted with dynamite in March, 1914. This plot is compared with a similar plot "changkolled" once only. The table shows that in spite of the large girths of the trees in the control plot at the commencement of the experiment, the trees in the plot that was dynamited increased in girth over the first six months 2·92 ins., while the control increased only 1·59 ins.; so that at the end of six months the average girth of the trees in the dynamited plot was 0·48 ins. greater, and at the end of nine months 0·71 in. greater than in the control. The increase during the last three months was not so rapid, although it compares favourably with the control. We hope that these experiments will be continued, not only in the Federated Malay States, and with rubber, but elsewhere with rubber and other crops as well."

PROGRESS ON CORNER HOUSE MINES.

Points from the Latest Quarterly Reports.

CROWN MINES.

The linear development at the Crown Mines in the September quarter showed a further increase of nearly 1,800 feet, the total being 12,759 feet. Of this, 7,630 feet were sampled, but the values were not so good as in the June period. The leader showed 21·7 dwts. (91s. 2d.) over 20 inches, the South Reef 11·4 dwts. (47s. 11d.) over 26 inches. The former thus yields 434 dwt. inches, which compares with 590 in the June quarter, and with 400 for the whole of last year. South Reef indicated 296 dwt. inches as against 315 in the June quarter. Working profit was £270,555, or £64,000 less than shown in the June quarter. The current period had, however, to bear a charge of £23,609 further provision for realisation charges of gold from mid-October, 1914, to 31st August, the amount previously allowed proving to be insufficient. Capital expenditure, £25,987. No drawing for repayment of debentures for 1915 will be made, sufficient having been purchased.

CITY DEEP.

The tonnage of 183,400 crushed by the City Deep in the September quarter is the largest yet recorded, the native labour position being now satisfactory. The total footage in development was 1,350 higher, totalling 7,429. Of this, 3,245 feet were sampled on the Leader, giving 22·1 dwts. over 27 inches, equal to 596 dwt. inches, which compares with 711 and 518 for the two previous quarters and 504 for last year. Sampling on the Main Reef was poor, and on the South Reef meagre. Sand-filling through the circular shaft was commenced towards the end of September. The working profit was £175,006, or 19s. 1d. per ton, but the quarter's revenue was reduced by £9,503 further provision for gold realisation charges in the previous nine and a half months.

FERREIRA DEEP.

During the quarter ended September 30 the Ferreira Deep made a working profit of £113,679 (equal to 13s. 9d. per ton milled), the total working expenditure was £156,772 (equal to 18s. 11d.), and the revenue from gold £270,451, after making further provision for realisation charges from mid-October, 1914, to August 31, 1915, due to the war. Development operations on both reefs continued to expose satisfactory values. Good progress has been made with the work in connection with the reorganisation of No. 2 shaft outlined in last quarter's report, and the sinking of the vertical portion from the 3rd level has been commenced; it is hoped that rising from the 7th level to meet this may commence during November. The results for the quarter showed an improvement in profits due to the increased tonnage of 35,920 tons, and consequently appreciably lower working costs per ton milled. The native labour position at the present time is quite satisfactory.

GELDENHUIS DEEP.

Working profit, £27.479 (equal to 3s. 5d. per ton milled); total working expenditure, £174,621 (equal to 21s. 10d.); revenue from gold, £202,100, after making further provision for realisation charges from mid-October, 1914, to August 31, 1915, due to the war. An increased footage of development work has been accomplished for the quarter. The additional tonnage crushed has enabled an increased profit to be earned. The native labour supply is now satisfactory.

MODDER B.

In the quarter ended the 30th of September the Modderfontein B. Gold Mines made a working profit of £167,534 (equal to 25s. 8d. per ton milled). The total working expenditure was £100,768 (equal to 15s. 5d.), and the revenue from gold was £268,302 after making further provision for realisation charges from mid-October, 1914, to the 31st of August, due to the war. An increase in the number of native employees, together with the installation of an additional tube mill which came into operation towards the end of the quarter, enabled the tonnage milled to show an increase of 7,300 tons. The tonnage milled in September was 45,000 tons. An increased profit was obtained as compared with June quarter, the yield averaging 42s. 3d. per ton milled, which may be considered abnormally high, the grade of the ore mined being above the average value of the ore reserve. Reef disclosures from development continue to be satisfactory. The capital expenditure for the quarter amounted to £5,217.

NEW MODDER.

Working profit for the quarter, £164,071 (equal to 21s. per ton milled); total working expenditure, £133,912 (equal to 17s. 2d.); revenue from gold, £297,988, after making further provision for realisation charges from mid-October, 1914, to the 31st of August, 1915, due to the war. The working profit was less than in the preceding quarter, due to a slightly lower yield and a small increase in working expenditure. Good progress was made with development operations, and reef disclosures were satisfactory. The capital expenditure for the quarter in connection with development and equipment at the circular shaft amounted to £21,267. The native labour position is now satisfactory.

NOURSE MINES.

Working profit for the quarter, £28,968 (equal to 3s. 4d. per ton milled); total working expenditure, £172,904 (equal to 20s.); revenue from gold, £201,872, after making further provision for realisation charges from mid-October, 1914, to the 31st of August, 1915, due to the war. The tonnage milled for the quarter increased 19,000 tons, but a fall in yield of 3s. 2d., due to a reduction in the value of ore mined, adversely affected the profits, as compared with June quarter. There was virtually no expenditure on capital account. The supply of native labour is now satisfactory.

BANTJES POSITION.

The working profit of £2,998 earned by the Bantjes in the September quarter was lower than for the previous three months. For the year ending 30th June last the percentage of payability of lateral development in the two reefs only amounted to 19 per cent. In consequence of the poor development values so persistently encountered, the Board has recently considered the whole position of the mine with the view of deciding future policy. On the recommendation of the consulting engineer, development on the South Reef will now be practically abandoned owing to its poor value, and work will be concentrated on the Leader, where latterly better values have been obtained, especially on the 15th (lowest) level west. Until recently comparatively little development work has been done on the Leader, the South Reef showing the better results; the large extent of the undeveloped mining area provides great possibilities in the further exploitation of the Leader. For some time past a large development footage has been accomplished, and it is hoped further to increase this to about 1,500 feet per month without loss on workings account, but it is uncertain for how long such a programme can be carried out owing to the rapidly decreasing working places in the ore reserves and their decreasing value. It is impossible to give the standing of the ore reserves until the annual recalculation takes place. The development for the first nine months of the current year, consisting of nearly 10,000 feet (44½ per cent. on South Reef and 35 per cent. on Leader), shows that the payable tonnage exposed is much less than that mined, and there is evidence from stoping operations that the blocks of ore composing the ore reserves estimated to be on hand at the end of last year may reflect a somewhat diminished value when recalculated. The amount of cash in hand after providing for all liabilities, but when including the mine development redemption fund, is £29,600. As the cash on hand is so limited, the sinking of the main incline has been discontinued for the present. The Board has arranged with the adjoining mine, the Main Reef West, to drive into the Bantjes on the Leader, to test its value on an horizon which is some five to six levels below the depth at present attained by Bantjes main incline. Payable values are being obtained by the Main Reef West in this level. Owing to the company's general position, the repairs to the incline shaft, referred to in the last quarterly report, will not be carried out at present. All expenses have been cut down to a minimum; directors are being paid one-half the ordinary fees.

CHAMBER OF MINES QUARTERLY REPORT.

Labour Returns—Changes in Membership—Recruiting and the Industry.

The report of the Executive Committee of the Transvaal Chamber of Mines, to be presented at the ordinary meeting of the Chamber on Monday, the 20th inst., contains the following:—

Finance.

During the three months ended November 30, 1915, the disbursements amounted to £9,883 16s. 2d. This amount includes the quarterly contribution to the Transvaal Miners' Phthisis Sanatorium, £1,138 15s. 6d. The receipts were £10,996 11s. 4d., including £5,000 transferred from fixed deposit and refunds in connection with the Sanatorium contribution. The sum of £5,000 is now on fixed deposit and the balance to credit of current account on November 30 was £3,144 0s. 3d.

Native Labour.

The returns supplied by the Witwatersrand Native Labour Association, Ltd., show the following results for the months of September, October and November:—Number of natives employed by members of the Association on last day of month (including natives in the service of mine contractors, but excluding natives in the employ of members of the Association in the districts of Barberton, Breyten, Rooiberg and Orange Free State): On gold mines—September 204,833, October 210,017, November 210,068; on coal mines—September 9,713, October 9,513, November 9,432. The Witwatersrand Native Labour Association and the Native Recruiting Corporation furnish the following information with regard to the natives recruited by the Association and its members and the Corporation during the months of September, October and November, 1915, and the districts whence they were obtained:—

Source.	Sept.	Oct.	Nov.
East Coast—South of Lat. 22° S.	4,983	4,462	4,511
Cape Province	7,394	6,705	4,703
Transvaal Province	1,080	1,000	744
Basutoland and O.F.S. Province	2,186	2,115	1,058
Bechuanaland	588	407	324
Natal Province	745	671	633
Swaziland	930	736	624
Rhodesia (incl. via Pietersburg)...	34	18	19
Local	8,764	7,864	6,493
	26,704	23,978	19,109

The monthly report issued by the Department of Native Affairs shows that at October 31, 1915, 287,886 coloured persons were employed in labour districts of the Transvaal. Of this number 232,722 were engaged on mines and on the various classes of works—*i.e.*, chemical, metallurgical, brickmaking and other works as defined in Part I. of the Coloured Labourers' Health Regulations, 1906—and 55,164 were in other employ. Interviews have taken place between representatives of the South African Winding Engine Drivers' and Firemen's Association, the Winding Engine Drivers' Mutual Protection Society and the Chamber, and your Executive Committee has decided in favour of the principle of an agreement dealing with the conditions of work of certificated winding engine drivers, the draft of which is in course of preparation.

Holiday Leave for Mine Employees.

Your Executive Committee has approved of a comprehensive scheme of leave privileges for mine employees (other than officials) of gold mining companies, members of the Chamber. The scheme has been under consideration since May last, when the principle was agreed, and came into operation on December 1, 1915. In November a Select Committee was appointed by the Government to inquire into the working of the Miners' Phthisis Act, 1912, and the Miners' Phthisis Act Amendment Act, 1914. The evidence of the Chamber is in course of preparation, and will be submitted to the Select Committee in due course.

Dust Sampling.

The Dust Sampling Department which was established by the Chamber in May of last year, has now almost completed its fourth dust sampling survey of the mines. The present staff is only sufficient to enable each mine to be visited once in every five months, and in view of the value of the work performed by the department, the Executive Committee has decided to increase the staff to an extent sufficient to enable every mine to be visited once in two months, and mines showing bad results still more frequently. In addition to enlarging the Chamber's staff, the Executive Committee has recommended to members the advisability of each mine arranging for dust sampling to be undertaken by a member of the mine's staff, the work being carried out on a uniform basis, and the results analysed in the Chamber's laboratory. In conjunction with the Central Buying Committee, your Executive Committee continues to watch carefully the position as regards mining supplies. Recently the advisability of economising in the use of the higher grade explosives in order to conserve the supplies of glycerine in the United Kingdom, has been under consideration, with satisfactory results.

Munitions and Industries Commission.

In November the Government appointed a Commission to investigate and report upon the extent to which the engineering workshops of the Union can relieve the workshops in Great Britain by manufacturing a portion of the Union's engineering requirements locally. Your Executive Committee has appointed Mr. W. Gemmill as the Chamber's representative on the Commission, which contains representatives from all the principal centres of the Union.

South African Expeditionary Force.

Your Executive Committee has decided that mine employees in the service of companies represented by the Chamber who have volunteered, with the consent of their employers, for service in any Imperial Service Contingent found by the Union for service in Central or East Africa, shall be given the same conditions as their employees who have joined the South African Expeditionary Force for European Service. The payments to be made will be in addition to the military pay such mine employees may receive.

Dividends Payable to Alien Enemies.

The question of whether the provisions of the Trading with the Enemy Amendment Act, 1914, of Great Britain, are generally applicable to companies, the head offices of which are situate in the Union, is being tested in the English Courts. The Minister of Finance has stated that legislation on the lines of the above Act will be introduced in the present session of Parliament. A Bill to consolidate and amend the laws relating to the granting of letters patent for inventions and the registration of patents, designs, trade marks and copyright, has been introduced in the House of Assembly. Copies of the Bill have been furnished to the Chamber, and representations thereon will, if necessary, be made to the Government.

Staff.

Ten of the Chamber's staff (other than officials) of its 21 members have volunteered for active service. Of that number one has not been permitted to enlist by reason of the special nature of his duties, and one failed to pass the necessary medical examination. Eight members of the staff, therefore, have been permitted to proceed on active service, one for service in Europe and the remainder for service with the Central and East African Contingents. The services of those who are not eligible for military service have been engaged temporarily to fill the vacancies so created.

MEMBERSHIP.

The following withdrawals from membership, as from 31st December, 1915, have been notified:—The African and European Investment Co., Ltd.: Representative, Mr. G. Falcke. The Anglo-French Exploration Co., Ltd.: Representative, Mr. W. Dalrymple. Consolidated Gold Fields of South Africa, Ltd.: Representative, Mr. D. Christopherson. Daggafontein G.M. Co., Ltd.: Representative, Mr. J. Davidson. New Rietfontein Estate Gold Mines, Ltd.

REPRESENTATION.

The following changes in representation have taken place:—The Consolidated Mines Selection Co., Ltd.: Mr. F. R. Lynch vice Mr. W. L. Honnold. New Rietfontein Estate Gold Mines, Ltd.: Mr. W. L. White, withdrawn. Ginsberg G.M. Co., Ltd.: Mr. W. L. White vice Mr. J. G. Lawn. Transvaal Coal Trust Co., Ltd.: Mr. W. S. Saunders vice Mr. F. R. Lynch. Witwatersrand Deep, Ltd.: Mr. W. H. B. Frank vice Mr. A. Mackie Niven. The Clydesdale (Transvaal) Collieries, Ltd.: Mr. R. Des Clayes vice Mr. J. E. Orr. The Knights Deep, Ltd.: Mr. C. Hely-Hutchinson vice Mr. R. Parnell. Crown Mines, Ltd.: Mr. R. C. Warriner vice Mr. F. H. Barry.

THE OUTLOOK FOR THE LUIPAARDSVLEI ESTATE.

Increased Average Monthly Profits—Points from Directors' Report.

THE report of the Luipaardsvlei Estate and Gold Mining Company, Ltd., for the year ended 30th June, 1915, states that the net profit for the year is £14,249, and this amount, added to the sum already standing to credit of profit and loss account, increases it to £137,128. From this amount has been deducted the sum written off for depreciation in compliance with the recommendation of the general manager, £11,370, leaving a balance of £126,757. As stated in previous reports, this balance is largely represented by the additions which, during the last few years, have been made to the general equipment of the mine and to the property, and to that extent is not in a liquid form. The directors recommend a dividend of 9d. per share, less income tax. During the year £7,590 of the company's debentures were purchased. At the date of the accounts the balance outstanding was £79,965, which has since been reduced to £79,650. Revenue from claim and township licences and from rents and sundry revenue amounted to £10,805. Operations were seriously impeded at the beginning of this year by the abnormal rainfall which flooded several of the best levels, and necessitated on occasions the entire or partial cessation of crushing in order to cope with the inrush of water and prevent the mines being wholly flooded. As a result the four months of January, February, March and May showed a loss on working. Such a heavy rainfall, amounting in five months to the normal fall of three years, is obviously quite exceptional, but the board have, nevertheless, considered it advisable, on the general manager's recommendation, to instal immediately additional pumping plant in order to be in a position to cope adequately and promptly with such an emergency in the future. The average monthly profit since July last has amounted to £4,418, compared with a monthly average of £1,866 during the twelve months covered by the present account. 218,453 tons of ore were crushed, being at the rate of 10·8 tons per stamp per working day. The average grade of ore sent to the mill was 4·896 dwts. per ton and the total recovery was 96·87 per cent. of the gold contents. The yield from all sources was 20s. 7·647d. per ton crushed. The average working expenditure was 19s. 6·914d. per ton crushed, which includes a charge for development redemption at 2s. 11·737d. per ton on the tonnage crushed. Repairs and renewals as well as the company's contributions to the Miners' Phthisis Compensation and Insurance Funds have been included in the working expenditure. The increase in working costs is due to the advance in the price of materials and mining stores occasioned by the war, and especially to the heavy additional pumping charges caused by the floods. Of the ore milled 35·58 per cent. came from the east (Windsor) section, 52·70 per cent. from the western section, and 11·72 per cent. from the Battery Reef (east and west) section. Of the tonnage mined 65·87 per cent. came from the Main Reef, 17·32 per cent. from the South Reef, 9·84 per cent. from Battery Reef stopes and 6·97 per cent. from development. During the year 14,460 tons of accumulated slimes have been treated, producing gold equal to 2·727 dwts. per ton treated, and realising a profit of £4,089. The footage accomplished for the year in driving, raising, winzing and crosscutting was 10,999 feet. Further development in the East Battery Reef section, to which reference was made in last year's report, has confirmed the favourable opinion which was held of its prospects. The general manager states that the probable areas of high value which are indicated in surface prospecting should make this section of great importance. Both from this part of the property as from other sections good developments are reported during the first four months of the current financial year. The payable ore reserves on a re-estimation at 30th June last were as follows: Fully developed, 702,123 milling tons, of an average assay value of 5·30 dwts. per ton. Partially developed, 29,637 milling tons, of an average assay value of 5 dwts. per ton, and 30,600 milling tons of ore, of an average assay value of 5·2 dwts. per ton.

German Activity in Neutral Countries.

The *Standard* special correspondent in Switzerland says that a characteristic example of pushing German business enterprise which aims at securing financial and, indirectly, political influence in neutral countries, has just been given in the Swiss canton of Berne. With a view to obtaining the contract for the construction of the new electric railway from Haute-Argovie to Seeland, the Allgemeine Elektricitats Gesellschaft, of Berlin, bought shares in the Swiss company formed to build and work the line to the extent of £3,750, of which £880 had been paid up. But the Swiss Government, on learning of the transaction, intervened, and compelled the directors of the Haute-Argovie Company to cancel the sale of shares to the Berlin concern and to refund the amount already paid, with interest at 6 per cent., to the German purchasers. The Swiss Government now makes it known that this step was taken " in the interests of Swiss industry."

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Cape Electric Tramway's Report.

The report of the directors of the Cape Electric Tramways Company for the year ended June 30th, states that the profit and loss account shows a profit of £80,615 7s. 2d., and, after providing for debenture interest, redemption of debentures, and taking into account the balance brought forward from last year, a net credit balance of £44,286 0s. 11d. remains. From this amount the reserve fund has been credited with the sum of £12,000, leaving a balance of £32,286 0s. 11d. The directors, therefore, recommend the payment of a dividend in respect of the past year of 5 per cent. on the ordinary share capital of the company. This will absorb the sum of £24,561 2s., leaving a balance of £7,724 18s. 11d. to be carried forward to next year. During the past year the tramways carried 21,680,070 passengers, earning £206,122 19s. 4d., as against 20,886,146 passengers, earning £200,409 3s. 5d. in 1913-14.

Rhodesian Section.

LATEST MINING NEWS.

Lonely Reef—New Rhodesia Mines—Anglo-French Matabeleland—Mayo (Rhodesia) Development—Cam and Motor Prospects—Gaika Gold

If the reef in the Lonely only holds at the No. 15 level the prospects of the mine will be very greatly improved. The first crosscut at this random shows a value of 37 dwts. over a width of 54 in. This is much better than the average width and value of any of the higher levels. It will be remembered that the Nos. 10 and 11 levels were disappointing and that the next two showed an improvement. A further crosscut is now to be started to open up the reef at the 14th level 125 ft. nearer the surface.

* * * *

The directors of the New Rhodesia Mines report for year to May 31 that since the last report 145 mining claims have been abandoned on the advice of the company's agents in Rhodesia. New agreements have been entered into for the tributing of the Howard claims for three years from April last. The old Bulawayo claims will again be let on tribute if the development work now being carried out is satisfactory, and a provisional agreement has been entered into for tributing the Kameel claims at a reduced royalty. Lead and zinc mines in Norway. "Husvik."—No decision has yet been arrived at as to the most suitable process for treating the somewhat complex ores on the property, and it will be necessary to await the termination of the war before financial support can be expected. Porcupine Krist.—The company still retain their large share holding in the Porcupine Krist-Thompson Mines, Ltd. The cash financial resources of that company do not permit of development work on a large scale being carried out at the present moment. The company's holding in the debentures issued by the East Kent Colliery Company remains as at the date of the last balance sheet, the scheme of reconstruction not having been carried through.

* * * *

The profit and loss account of the Anglo-French Matabeleland for the year to May 31 shows a credit balance of £27, which, with £5,831 brought in, in all £5,858, the directors propose to carry forward. The available cash assets, together with the amount on loan, less sundry creditors, amounted to approximately £23,504 at the close of the financial year, as compared with about £26,575 at May 31, 1914. There have been no sales of the company's land during the year. The stock at the commencement of the year totalled 1,085. The net increase during the year was 253, showing stock on hand at May 31, 1915, of 1,330. An independent valuation of these cattle was made as at May 31 which amounted to £9,751. The manager in Rhodesia states that last year was a bad one for cattle throughout the country. After three consecutive years of drought there was an abnormally wet season, but in spite of this drawback the company had comparatively few losses of young stock and a very fair percentage of increase. Owing to the war, expenditure on improvements was cut down to a minimum, and only such work as was absolutely necessary was undertaken.

* * * *

The directors' report of the Mayo (Rhodesia) Development Company for the year to July 31 states that the company now owns 386 claims, 38 claims having been acquired during the year and 50 abandoned. In addition to the claims, buildings, plant, etc., at the close of the financial year, the company held £22,784 investments at cost, and had £741 at bankers and £9,981 on loan against securities. The loans from bankers and others owing by the company amounted to £29,844. Owing to the restriction in market dealings, it is difficult—the directors add—to ascertain the quoted prices of some of this company's investments, shares, and debentures. With regard to the investments, viz., £22,784 4s. 10d., about 80 per cent. of these are quoted in the financial papers on July 30 last, and show a deficiency of about £3,900. The shares and debentures stand in the balance sheet at their book cost, viz., £129,854 18s. 10d., about 47 per cent. thereof are quoted at July 30 last, and on this proportion there is a depreciation of £23,900. In an accompanying report Mr. Cyril E. Parsons, the consulting engineer, makes the following return from mines leased:—

	Tons treated.	Fine gold. Ozs.	Value.	Net royalty received.	Grade recovered. Dwts.
Enney ...	5,726	1,973·87	£8,208 18 9	£517 15 3	6·8
Plum ...	330	133·63	554 19 3	27 14 11	8·0
Shepherds ..	11,297	4,389·18	18,223 18 4	1,822 7 9	7·7
	17,353	6,496·58	£26,987 16 4	£2,367 17 11	

Mr. Parsons adds:—Results obtained from the small amount of work done gave sufficiently good results to justify further operations on a larger scale. The Plum Mine, though the tributor gave it up, might, with more prospecting, improve. On the Tip Top Mine development work has continued during the year, and we hope soon to have a fair tonnage developed, at least sufficient to justify a small plant. The prospects of the two properties now being worked by tributors, viz., the Enney and the Shepherds, are in both cases encouraging.

* * * *

The winze from the No. 6 level, 580 ft. south, in the Motor mine, is disclosing good widths and values. Here is its record to date:—0-11 ft., average width 62 in., average value 61s.; 11-24 ft., average width 56 in., average value 34s.; 24-48 ft., average width 56 in., average value 79s.; 48-83 ft., average width 40 in., average value 58s.; 83-97 ft., average width 72 in., average value 69s. 6d. Influx of water explains the small footage accomplished in October; the average width of 72 in. is capital. Unfortunately, other development in the mine was unsatisfactory. Some fairly good disclosures were made at a couple of points in the Cam Good Shepherd.

* * * *

The report of the Gaika Gold Mining Company, Ltd., for the year ended 30th June states that the net profit, after deducting depreciation, is £34,436, and the balance brought forward, £14,921, makes £49,357. Dividend No. 5 of 5 per cent. paid 20th January absorbed £13,675, dividend No. 6 of 10 per cent. paid 14th July £27,349, and directors' percentage of profits £708, leaving a balance to be carried forward of £7,624. Although the profit for the year would not have permitted of a material increase on the dividends paid in the preceding year, the directors felt justified in recommending dividends amounting to 15 per cent., as against 10 per cent., by distributing the accrued balance of profit brought forward from preceding years, the reason for retaining which no longer existed. The ore reserves at 30th June were estimated at 95,570 tons of an average assay value of 14·14 dwts. per ton, as against 100·770 of an average assay value of 14·62 dwts. at 30th June, 1914. This shows a decrease of only 5,200 tons, notwithstanding that 37,514 tons were milled during the year. The expenditure on new machinery, plant, buildings, etc., was £4,734. During the year 37,514 tons of ore were treated, yielding a total of 20,811 ozs. of fine gold of the estimated value of £87,465. Working costs and realisation charges amounted to £49,180, leaving a mining profit of £38,285, subject to deduction of depreciation, London charges, etc. Working costs were 25s. 8·56d. per ton, as against 25s. 11·10d.

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THE NOVEMBER GOLD OUTPUT IN DETAIL.

Record Thirty Day Month and Average Yield—Improved Rate of Production.

The Transvaal gold output for November was declared by the Chamber of Mines on November 10 to be 781,013 ozs., value £3,317,534. This is 16.618 ozs. (£70,588) less than the record total declared for October, which contained one working day more than November, but it is the best return for a thirty-day month. In October the Witwatersrand mines produced gold at the rate of £105.480 per day, while in November the daily average yield was £106,703, an increase of £1,223, although the position as regards native labour and the number of stamps employed was practically unchanged. The official output figures for November as compared with these for October are as follows:—

Total output	781,013 ozs.
Decrease	16,618 ozs.
Value	£3,317,534
Decrease	£70,588
Witwatersrand	753,605 ozs.
Decrease	16,193 ozs.
Value	£3,201,112
Decrease	£58,781
Outside districts	27,408 ozs.
Decrease	425 ozs.
Value	£116,422
Decrease	£1,807
Total stamps	10,084
Increase	22

THE STAMP POSITION.

In October 10,084 stamps were dropping on the Transvaal goldfields, as against 10,062 in October, an increase of 22. The official figures are as follows:—

	Rand.	Outside.	Total.
October	9,530	532	10,062
November	9,530	553	10,084
Increase	—	22	22

NATIVE LABOUR.

For the three months the figures are:—

	September.	October.	November.
Gold mines	204,833	210,017	210.063
Coal mines	9,743	9.513	9,432
Totals	214,575	219,530	219.500

THE OUTPUT IN DETAIL.

The following are the returns of the Witwatersrand mines:

THE WITWATERSRAND.

	Ounces.	Value. £	Inc. £	Dec. £
Aurora West United	3,593	15 262	—	1,759
Bantjes Consolidated	5,321	22.502	—	251
Brakpan Mines	20,872	88,558	—	2,201
City and Suburban	12,029	51,096	—	327
City Deep	29,191	123.995	—	1,221
Consolidated Langlaagte	16,370	69,535	917	—
Consolidated Main Reef	10,226	43,437	556	—
Crown Mines	63,990	271.812	—	9,978
Durban Roodepoort	3,479	14,778	204	—
Durban Roodepoort Deep	8.253	35.099	—	2,978
East Rand Proprietary Mines	54.126	229.913	—	8,215
Ferreira Deep	23,548	100.025	—	4,287
Geduld Proprietary Mines	9.951	42.259	—	1,415
Geldenhuis Deep	17,754	75.414	—	735
Ginsberg	4,113	17,471	—	442
Glencairn Main Reef	3,391	14,404	—	493
Government G.M. Areas	16,326	69 349	—	925
Jupiter	5,515	23.430	3,822	—
Knight Central	7,557	32.100	—	102
Knights Deep	19,929	84,653	—	5,110
Langlaagte Estate	13.775	58 516	—	1.687
Luipaardsvlei Estate	5,708	24.246	—	561
Main Reef West	6,769	23,753	—	102
May Consolidated	2,554	11,273	—	209
Meyer and Charlton	7,958	33,846	—	493
New Heriot	5.659	24.038	—	301
Modderfontein B.	22,370	95,022		5,806
Modderfontein Deep Levels	14.947	63,491	—	323
New Goch	6.561	28.294	—	1,503
New Kleinfontein	16,385	69.604	—	1,677
New Modderfontein	25.031	105 325	—	238
New Primrose	3.961	15.825	—	1.470
New Rietfontein	141	599	—	1,147
New Unified	3,341	14,192	—	51
Nourse Mines	15.127	63.503	—	4,834
Princess Estate	6,727	28,574	—	230
Randfontein Central	61,114	259,596	—	5.097
Robinson G.M.	17,961	76,293	—	2,230
Robinson Deep	18,905	80,303	1,435	—
Roodepoort United Main Reef	8,085	34,338	1,698	—
Rose Deep	20,106	85,405	2,846	—
Simmer and Jack Proprietary	17,551	74,552	353	—
Simmer Deep	13,165	55.926	2,001	—
Van Ryn Estate	11,139	47,315	—	209
Van Ryn Deep	19,501	82,835	4.069	—
Village Main Reef	2,848	12,098	—	8,219
Village Deep	17,781	75,529	—	3,041
Vogelstruis Estate	3,573	15,177	467	—
West Rand Central	568	2,413	—	46
West Rand Consolidated	9,439	40,073	—	2,098
Witwatersrand	12,920	54,881	—	339
Witwatersrand Deep	13,060	55,475	—	1,011
Wolhuter	10,268	43,616	—	773
Miscellaneous producers	—	7,884	—	3,007

OUTSIDE DISTRICTS.

	Ounces.	Value. £	Inc. £	Dec. £
Nigel	3,482	14.790	1,223	--
Sub Nigel	3,703	15,729	280	—
Barrett	283	1,203	—	513
Sheba	2,153	9,145	—	1,912
Worcester Exploration	875	3,717	—	569
Glynn's Lydenburg	1,615	6,860	153	—
Transvaal Gold Mining Estates	7,090	30,116	233	—
Quest	639	2,706	34	—
Fairview (T.C.L.)	691	2,935	—	72
Rietfontein (T.C.L.)	268	1.138	—	548
Miscellaneous producers	—	28,083	194	—

GROUP PROFITS.

The following is a list of the profits returned for September, October and November:—

	September. £	October. £	November. £
Central Mining	269,962	242.028	228,784
Rand Mines	193.365	194,959	174,236
Barnato	130,527	129,397	130.590
Consolidated Gold Fields	75,187	76.316	78,724
Albu	65,257	67,539	62,644
East Rand Proprietary Mines	55,011	57,023	53,046
Neumann	50,986	51,796	53.488
Goerz	49,311	50,393	51,246
Consolidated Mines Selection	31,022	33.111	32,330
Kleinfontein	22,339	23,023	22,304
Totals	£942,968	£925,585	£885,392

CENTRAL MINING.

New Modderfontein	57,762	58,431	59,119
Robinson G.M.	38,403	37,197	35,047
Village Main Reef	25.668	*4,239	*10,052
Bantjes Consolidated	1,112	759	130
City Deep	60,006	60,501	60,440
Village Deep	25.771	25,197	25,521
Modderfontein B.	61.160	64,182	56,589

*Loss.

RAND MINES.

Crown Mines	95.515	97,331	81,776
Durban Roodepoort Deep	5,850	5.664	4,462
Ferreira Deep	50.887	43.031	38,977
Geldenhuis Deep	11.484	13,830	14.517
Nourse Mines	11,095	13.289	10,269
Rose Deep	18.535	21,814	24,235

CONSOLIDATED GOLD FIELDS.

Knights Deep	15.232	16,184	15,189
Robinson Deep	24.273	25,087	26,314
Simmer and Jack Proprietary	28,514	29,069	28.563
Simmer Deep	4.042	2,441	3,145
Sub Nigel	3,126	3.536	3,042
Jupiter	*6,688	*315	2,468

EAST RAND PROPRIETARY.

Angelo, Cason, Driefontein. New Comet	55,011	57,023	53,046

KLEINFONTEIN.

New Kleinfontein	22.339	23,023	22,304

BARNATO.

Consolidated Langlaagte	29,024	28,123	28,627
Ginsberg	4,169	4,039	3,552
Glencairn Main Reef	2,430	2,656	2.321
Government G.M. Areas	15,216	16,059	17,253
New Primrose	6,077	5,016	3,901
New Unified	5,037	5,006	4,729
Quest	420	227	206
Van Ryn Deep	43,119	43,061	45,045
Witwatersrand	25,035	25,210	24,956

ALBU.

Aurora West United	4,039	3,122	1,714
Meyer and Charlton	20,767	20,831	19,918
Roodepoort United Main Reef	2,539	2,066	3,442
Van Ryn	19,599	19,647	19,680
New Goch	8,035	8,573	7,053
West Rand Consolidated	10,278	13,300	10,836

NEUMANN.

Witwatersrand Deep	16,034	16,050	16,631
Consolidated Main Reef	13,547	13,934	14,312
Main Reef West	3,671	3,839	4,198
Knight Central	4,062	4,053	4,401
Wolhuter	13,672	13,920	13,951

CONSOLIDATED MINES SELECTION.

Brakpan Mines	31,022	33,111	32.330

GOERZ.

May Consolidated	1,031	1.032	1,081
Princess Estate	756	607	1,006
Geduld Proprietary Mines	12,778	14,195	14,004
Modderfontein Deep Levels	34,746	34,559	35,155.

MONTHLY OUTPUT RETURNS.

The following table gives the monthly returns for 1912, 1913, 1914 and 1915:—

	Ounces.	Ounces.	Ounces.	Ounces.
January	737,060	789.390	651.753	714,984
February	703,886	734,112	626,261	676,229
March	*830,723	790.552	686,801	753,935
April	737,660	784,974	683,877	744,080
May	779,662	794,306	720,229	763,548
June	753,936	747,077	717,926	755,280
July	766,338	655,389	732,485	770,355
August	764,737	728,096	711,918	778,763
September	747,893	706,186	702,170	776,750
October	758,681	718,431	733,746	797,631
November	757,837	678,486	715.836	781,013
December	776,406	672,815	695,137	—

*Including gold reserves extinguished.

MEDICAL EXAMINATION OF EMPLOYEES.

THE physical examination of employees to prevent the placing of unfit men in responsible positions has been instituted by many firms and corporations, and is desirable on the Rand for reasons other than the phthisis evil. It has always been attended with good results so far as efficiency in the work and satisfaction to the employee have been concerned; nevertheless, the practice has always been more or less opposed by the labourers themselves. In instituting the practice at the works of the Nevada Consolidated Copper Co., the authorities have taken pains to explain the reasons for doing so, and the effect it will have upon employees. This explanation is so clear and reasonable that it is worth while reproducing here.

Men seeking employment, or having secured positions through the employment department, will be put to work "subject to medical examination." It will be required of every man employed to submit himself for physical examination immediately upon entering the service of the company, or during the time he is seeking employment if he so desires. It will also be requested that emlpoyees now on the pay-roll shall take advantage of the opportunity to be examined. This task of examining employees will be commenced at once and will be spread over such period of time as may be necessary to its accomplishment, taking into consideration the convenience of the medical department and of employees. Employees need not worry over the result of physical inspection, nor need they borrow any thrills of terror of its "hurting" them in any way, physically or financially, in the assurance that no man now on the company payroll will suffer the loss of employment because of any ailment or physical defect; and in the further assurance that the results of individual examinations will not under any consideration be made public. Nor will men now in the employ of the company who may take the examination be requested or required to sign any release or undertaking which will affect in any way their present hospital agreement or existing relations with the Nevada Industrial Commission. It is intended that such examination as will be made shall be of as great, if not greater, benefit to each individual than it will be to the company. It will be practically in line with the scheme of the big life-insurance companies, which are making provision for free medical examination for their patrons and urging all their policy holders to submit to medical examination at least once a year. The object is to enable men to anticipate and ward off the approach of physical ailments, on the theory that "a stitch in time saves nine." So far as the company is concerned, it is a safety-first proposition, a measure to promote accident prevention by trying to fit a man to a job wherein he will not be a menace to himself or to his fellow-workers. Relatively speaking, the hazards of every workman's occupation are affected by many elements of chance, human error, negligence and ignorance—but there is no reason why an employee should be subject to the further danger, the unseen, invidious menace of a fellow-employee's physical unfitness for his job. You, Mr. Miner, would not like it, would you, to risk your life daily on a cage controlled by a hoist engineer who might be subject to heart disease and who might collapse at any moment and drop you into the sump or drag you up into the sheaves. You would not like it, would you, Mr. Smelter-man, if a dinkey engineer should run amuck with his engine and a train of molten slag around the yard, endangering the lives of employees, because he could not see or was unable to determine the colour of signal flags or lamps? You, Mr. Millman, would not want to work around a machine or machinery operated by a man who was not thoroughly fit physically, as well as mentally, to control that machine in case of emergency, would you? If hazards of this nature can be done away with, you would be willing to help, wouldn't you? Many of the employing industries in this country and in Europe have required their medical departments to render this service, and not one word of protest has been made by employees, because men have come to see and understand that physical examination has largely eliminated a serious hazard in their daily work, a hazard to which they might otherwise, unknown to themselves, be subject.

Kaffir Kraal in Liquidation.

In the Rand Division of the Supreme Court this week Simon Sacke applied to the Judge-President for an order winding-up the unregistered syndicate known as the Kaffir Kraal Gold Mining and Development Syndicate, and the appointment of Somerville Craig Carruthers, chartered accountant, as liquidator. His Lordship granted provisional liquidation, with Mr. Carruthers as liquidator, and ordered advertisement. The petition stated that the capital of the syndicate, which was formed in 1888, was £20,000, of which £5,000 was set aside as working capital. The assets of the syndicate consist of a piece of land in the district of Potchefstroom, worth about £200, and further assets consist of about £200 in cash. At the formation of the syndicate its members were D. R. Hurley, F. B. Despard, H. Eckstein, C. Hanau, P. B. Eastwood, J. W. Peard, C. M. Douthwaite, J. G. Schultz, and the petitioner. The petitioner stated he was not aware who were the present shareholders, nor did he know the whereabouts of most of the original members. Petitioner and C. Hanau were appointed trustees at the time of the syndicate's formation. About October, 1890, the syndicate ceased to do business, when 75 per cent. of the working capital had been lost.

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Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Karoo Coal Prospects.

To the Editor, *South African Mining Journal.*

Sir,—With regard to certain criticisms by Mr. Mills Davies bearing upon the information supplied to you by me about the most recent developments on coal occurrences in the Karoo. The subject is one of such intense interest and such vital importance to that section of the Union known as the Western Province, its railway system, its shipping, and its industrial enterprises, that a little additional information, of which Mr. Mills Davies does not seem to be possessed, may be of interest. I therefore submit extracts from a letter by E. J. Dunn, Government Geologist to Cape Colony in 1885. In a letter dated August 6th, 1906, he says:—" In 1886 I concluded, as the result of many years' research in South Africa, most of it at my own cost, that besides the Taenopteris or Stormberg coal horizon there existed another and lower coal horizon, with the Glossopteris in which there was ever probability of workable seams of coal being found. In 1889 I fully verified these conclusions, and proved that the great coal seams of Vereeniging were in the Glossopteris, and 5,000 feet of stratified rocks separated the two horizons. In 1889 it was found that the Glossopteris coal extended over large areas, and had been traced far into Orange River Colony, but no attempt of any consequence had been made to prove whether coal existed at this horizon south of the Orange River. At the Candeboo nature has produced direct evidence that coal occurs in large quantities, and of great purity, associated with Glossopteris and other fossils and with similar rocks to those found at Vereeniging." And from a paper read by him on July 31st, 1889, before the South African Philosophical Society:—" When my 1886 report was written there was no workable coal known to occur within the margin of the area outlined by the Dwyka conglomerate, and the northern limit of the conglomerate remained to be filled in. Now this northern course of the conglomerate is known, and it is found that within these bounds and above the Dwyka conglomerate sometimes resting directly upon it, there are coal seams of enormous thickness and apparently extending over immense areas. Formerly the question was, do coal seams of workable character occur at the horizon of the Ecca beds? This question is now most fully answered in the affirmative by such extensive deposits as are worked at Vereeniging, Middelburg, and the South Rand coalfields. The question remaining now is: How far do these abnormally thick seams of coal extend? This is partly answered by the occurrence of great bodies of broken coal, fire clay, iron pyrites, enlarged nodules and black shales with impression of Glossopteris and calamites all mixed together in faults at the Candeboo and near Beaufort West. It is scarcely to be expected that over an area 800 miles long and from 150 to 350 miles wide an unbroken seam of coal exists, but that there are great areas within the margin of the Dwyka Conglomerate of workable coal is now proved at the northern end, and systematic drilling would doubtless soon result in proving extensive coal seams to exist in other portions of the basin." In the particular instance under review, it must be borne in mind that the discovery was made and a very considerable amount of sound prospecting work done extending over a long period, before the information you published was given to you; the desire of the present syndicate has been, in so far as they as a prospecting syndicate were able, to make sure of the soundness of their venture before acquainting the public. The position of this occurrence is undoubtedly more favourable than any previous discoveries, in this respect it is situated in the bottom of a huge basin near the base of the Nieuweveld escarpment, the surface altitude being only 2,200 ft. above sea-level, consequently being much nearer the geological horizon at which the main coal seam is anticipated, viz., the base of the Ecca series and above the Dwyka. The coal does not outcrop but is located by certain curious surface indications, and its existence proved by sinking prospecting shafts. The fissures, judging from the work done, are remarkable for the regularity of their strike, dip and width. On one section of the property known as the eastern line of fissuring, which has been traced for 20 miles and proved coal bearing at various points along its strike, on its southern end a stretch of over 3,000 ft. has been proved by a series of shafts, one at every 400 ft. This section in particular justifies development, and it is from this that the coal giving a salorific value of 14·96 was taken. With regard to the coal, samples of it have been submitted to three analysts of good standing in Johannesburg, each of whom classes it as an excellent anthracite coal, thus confirming the Capetown Government Analyst's report. Therefore, in the face of evidence such as the reports and opinion of four highly qualified men, one cannot but accept their verdict against Mr. Mills Davies' theory. With regard to the nature of its occurrence, one requires to realise what is almost impossible to the human mind, viz., the immensity of the area over which these various coal fissures have been found and the infinitesimal section that even a 20 mile strike of fissuring would be of that area; then one could understand that with pressure and the consequent heat it would generate exerted over a large area on what to us would be a thick seam of bituminous coal, the resultant filling of such fissures under the above conditious would not be an impossibility. In any case, before a theory is condemned as unsound, the person who so condemns it ought at least to visit the place and thoroughly satisfy himself that the geological evidence has been wrongly interpreted; even then criticism if justified of an undertaking which offers every indication of being able to supply a fuel of such high calorific value to a part of the country which so badly needs it, should be very guarded, for I do not think it is necessary for me to point out to any true South African who has the interests of his country at heart what the discovery of a good coal seam in that part of the country would mean, nor the importance that Capetown as a coaling depot would mean to the British Empire. To-day it can be said that a line of fissuring having a strike of over 20 miles has been traced and that wherever opened up has been found to be coal bearing, with evidence to the effect that it exists in a workable width; while the evidence also is that from it a coal entirely smokeless and practically equal to Welsh coal can be produced. Does not this justify expenditure on its development, in order to determine the resources of the coal filled fissures? The principal point at issue, however, is the locating of the main seam or source from whence these fissures have derived their filling; to this end the syndicate are devoting all their energies. It is, however, no light undertaking on account of there being no data available regarding the thickness of the various strata overlying the Dwyka conglomerate, which geological horizon must be reached before the existence or otherwise of the anticipated coal seam can be determined. An encouraging feature resulting from the boring operations is that the first indicator of the existence of a horizontal coal seam was passed through at a depth of 330 ft., viz., the coal-bearing rock so frequently first met with in boring before reaching the coal measures. In Mr. Mills Davies' letter he gives no evidence or record of any of the undertakings to which he refers with regard to their boring operations, the geological information obtained from such work, nor does he in any single instance give proof that the Dwyka Conglomerate has ever been reached, which geological horizon alone can be the determining factor as to the source whence these fissures derived their coal filling, also without visiting the property and fully acquainting himself with the conditions appertaining there he questions the possibility of developing and mining it economically.—Yours, etc.,

ARTHUR L. CHAMBERS.

Johannesburg,
11th December, 1915.

Johannesburg Forest and Land Co.

To the Editor, *South African Mining Journal.*

Sir,—I should be very much obliged if you would kindly inform me whether the Johannesburg Forest and Land Company, Ltd., is still in existence, or whether it was liquidated, and, if so, when? The head office was in Johannesburg, and the secretary's name on the scrip in my possession is A. H. Koll, and one of the directors, E. Gabriel. This company paid me two dividends prior to the Boer War, and since then I have heard nothing more of them. The shares were issued on 2nd November, 1895. If you should be unable to give me the above information, I should take it as a favour if you could advise me as to the most likely person or place to institute inquiries. Trusting you will see your way clear to provide me with the above information, and thanking you in anticipation.—Yours, etc.,

H. SAMUELS.

P.O. Box 687, Bulawayo,
11th December, 1915.

[Perhaps some of our readers may be able to oblige our correspondent.—Ed., *S.A.M.J.*]

Miners' Phthisis Prevention.

To the Editor, *South African Mining Journal.*

Sir,—I would be glad if you could find room in your paper for a few remarks by a working miner on the recently published report and chart of the Miners' Phthisis Prevention Committee. These gentlemen have given us a very exact and able report as far as it goes, but I think they have neglected a very important point. Could they tell us what difference in amount of harmful particles breathed does the lashing of dry material make, and also what difference the running of machines in an "unwatered" or dry stope does make? A good few of the dust regulations prosecutions are based on the neglect of the latter precaution against causing of dust, and yet we have no report on this. From what I have heard and read, it appears that a large percentage of phthisis sufferers are trammers; now these men can hardly be said to have caught the disease from the dust caused by drilling dry or from going back into the smoke and dust after blasting. Now, on most mines these men work in the stopes and drives before the miners come down, and only too often the rock lashed is in a dry condition, and no watering down is done before the miner himself comes down. The Committee further reported that after half an hour's use of the water blast in a drive the amount of dangerous particles breathed was reduced to two millions p.m., and further that the air in the mine after standing over Sunday still contains so much harmful dust that the amount breathed is still four millions p.m. One would like to know then what the amount breathed, on ordinary working day mornings is; we can safely reckon it to be about three times as much, *i.e.*, twelve millions. This amount of harmful dust, the most harmful of all, as the men breathe it in all the time they are on shift, comes into the mine air from two main causes, namely, lashing dry rock and the previous evening's blast. Would it not reduce this volume of dust to a safe limit if each mine had a system of water blasts at the top of each stope or in the drive leading from the same; these water blasts could be put into action by each miner in the same way as the drive water blasts in development ends, the air and water at each station could be turned off half an hour afterwards by a native kept for that purpose, or even by the skipman in the course of his duties, by this system I think we can reasonably expect that the amount of dust in the mine air will be reduced to about three millions breathed per minute. And men like skipmen, underground haulage men, underground drill sharpeners, etc., should be immune from phthisis.—Yours, etc.,

L. J. VON MALTITZ.

Troyeville,
13th December, 1915.

British Trade in South Africa.

The British Electrical and Allied Manufacturers' Association forward an extract from the October issue of the association's journal. The association, which is supported by every British manufacturer of repute, is the strongest manufacturers' association in existence. One of its main objects is the promotion of British business in Colonial and foreign markets. We referred the other day to the growing increase in British imports, which is so serious a feature of the present financial situation. It is made the more grave by the simultaneous decline in exports. Just now special efforts are being made to bring about the manufacture in South Africa of what may be capable of being produced here, thereby leaving the Home factories free for munitions and other war work. But there remains the other aspect, to which attention has often been drawn—that of placing the orders for goods that have to be imported with British firms wherever possible, and in this connection the official organ of the "British Electrical and Allied Manufacturers' Association" says the export trade and the Navy are two inter-dependent elements of Great Britain's resources on which she and our Allies rely. The Navy has to be paid for by the commerce of the country; the Overseas trade has to be protected by the Navy. The manufacturing areas of France, Belgium and Russian Poland are crippled extensively by German occupation; therefore, their export capacity has declined; their means of paying for necessary imports is lessened; and these countries look to their Ally, Great Britain, for financial aid. The manufacturing areas of Great Britain are intact, but yet the exports from this country have decreased enormously. Responsibility rests with those who understand, even though they may not be State officials. These know that final success in the war depends on finances. Financial resources are the product of thought and labour. Imports must be paid for by the exportation of either manufactured products or reserves of capital. When reserves are exhausted borrowing is the only alternative. But if the exports and reserves of capital continue to decrease, and the imports to increase, at the present rate in Great Britain, how long will it be before difficulties will arise in securing credit? Therefore, it is clear that the credit of Great Britain rests on her manufacturing and exporting capacities. Buyers everywhere sympathetic to Great Britain will appreciate these facts; they can help the cause of the Allies by placing their orders with British manufacturers even though in some cases delivery is unavoidably delayed.

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REVIEW OF THE UNION LABOUR MARKET.

Position of all the Chief Centres—Distress at the Cape—Interesting Sidelights on South African Industries.

The monthly labour report issued by the Department of Mines and Industries shows that the following applications for employment, including renewals, were received by the Department during November:—

	Nov.	Oct.	Inc.	Dec.
Johannesburg ...	177	196	—	19
Capetown	148	155	—	7
Pretoria	140	120	20	—
Durban	255	239	16	—
	720	710	36	26

The applications from employers of labour were:—

	Nov.	Oct.	Inc.	Dec.
Johannesburg ...	34	21	13	—
Capetown	126	85	41	—
Pretoria	27	18	9	—
Durban	44	74	—	30
	231	198	63	30

Employment was found by the Department in Johannesburg for 32 persons, Capetown 57, Pretoria 64, and Durban 29.

IN JOHANNESBURG.

The report on the labour market in Johannesburg states, *inter alia*:—There have been some fears expressed that with the engineering departments particularly there was a danger of a shortage of skilled men taking place, owing to the mechanics volunteering for active service. It is quite possible that with increasing order in our local workshops on account of shipping difficulties, and the fact that a considerable number of skilled men have gone with the Overseas Contingent, besides others who have left privately, that the skilled labour may not be as easily obtained as it was during the South-West African campaign, but at present there does not appear to be serious inconvenience. Employers recognise that a man may be found unsuitable for active service, but quite satisfactory at the lathe or the bench in the workshop. Generally speaking, it is found that they are placing no obstacles in the way of their employees volunteering who wish to do so. At present there are openings for good moulders, but in other respects there is sufficient skilled labour to meet all requirements. The building trades are not quite so active, nor is the outlook so bright as indicated by the plans passed in the previous months, but the returns for the seven municipalities outside Johannesburg are only £7,000 short of the total estimated value (including Johannesburg) in November last year.

INDIVIDUAL TRADES.

The report on individual trades reads:—

Building Trades.—Employment fairly good in the different branches, but no shortage of men. This applies to carpenters, masons, bricklayers, plasterers, plumbers, painters and paperhangers.

Engineering.—In all branches the shops are comparatively brisk—in some cases very busy. The fitters, turners and blacksmiths reported idle are by no means numerous, but it is common knowledge that members of the union do not all intimate to the society that they are out of work as soon as they get laid off. I find that the moulders are particularly busy, and a few more hands could be well employed at the present time. In all other branches of the trade employment is quite good.

Machine Joinery.—Furniture, cabinet-making and upholstering continue quite busy, the number of hands employed continuing to increase.

Wood Turning.—Also more active than usual during the latter part of the month, but saw milling machines are running intermittently.

Shop Fitting.—Very quiet in the better class of work.

Stone Dressing.—Cemetery work is quite active.

Fibro Plaster.—Work is very dull.

Printing.—Trade improving, but not up to expectations.

Seasonable occupations, such as confectionery and mineral water manufacturers, are very busy. Leather works are receiving an increased share of the work going, but not to compare with November last year.

PRETORIA.

The local registration officer states that a full report on the recent visit of the acting assistant inspector of white labour to the Silverton Tannery is being prepared, but it should be mentioned that considerable progress has been made in the erection of buildings and vats and such machinery as has arrived from oversea, that tanning has commenced and that several hundred sheepskins are nearly ready for dispatch to Johannesburg to be made up into coats for the troops in Europe. At present there are 11 white employees in addition to some Africander youths, who are learning the work, and 18 natives. The bureau had been asked by the officer in charge of recruiting men locally for the military police for duty in the South-West African Protectorate to assist him by advertising the vacancies in the force amongst suitable applicants for employment. Several roadworkers had been already sent him and in addition he had been put in communication with men in country districts.

Mining.—No improvement on recent months. It is, however, reported that operations on a limited scale are to be resumed at the Premier mine at the beginning of the new year, but that there are sufficient men already employed on relief work on the property to meet the requirements.

Engineering.—Considerable activity was shown in all branches except electrical work, which is reported slack.

Building.—A slight improvement is noted owing to the commencement of several small houses in the suburbs and to fairly extensive alterations and additions to some large premises in town. Notwithstanding this, a considerable number of masons, bricklayers, housepainters and carpenters are either unemployed or engaged on road work.

Printing.—No improvement on previous months. Paper is still scarce and dear. Bookbinding very slack.

Clerical and Semi-Professional.—The supply continues to exceed the demand, although there are indications of some demand for men to temporarily replace those who have joined the military forces.

Milling, fair; bread and biscuit-making, good; sweet-making, good; tailoring, fairly busy; boot and shoe-making, improved owing to seasonal demands (the bureau was unable to fill a vacancy for a competent repairing hand); retail trade, fair to good, but furniture dealers and dealers in general household requisites complain of a decrease in turnover compared with last month.

CAPE PENINSULA.

Referring to the Cape Peninsula, it is reported that the building trade is much depressed and many artisans, coloured and European, are unemployed. It has been announced that the City Council contemplates the erection of dwellings for their workmen on vacant ground owned by the Council, but it was improbable such a scheme would do more than afford some slight relief either to the men in search of work or the many prospective tenants for hire houses with modern conveniences. The demand for white labourers and handymen was negligible, and in view of the scarcity of work, the City Council had been asked by the Labour Department to specially consider the desirability of reserving a section of the excavation work on the new Peninsula drainage scheme for white men only. It had been pointed out that a well-considered system of piecework would meet any prospective objections raised against the employment of white men on the ground of inefficiency or extra cost. There was no decrease in the number of white unemployables and derelicts who continued to be a constant source of trouble and expense to charitable bodies. It was stated at a meeting recently held by the Charity Organisation that cases of men who are unemployable on account of weakness of body or mind continually recur and there was no institution to which such men could be sent with a view to training them to become even partly self-supporting and a definite effort made for their reformation. The only remedy likely to effect a real reformation would be the establishment of a labour colony. Considerable unemployment and distress was reported from Calitzdorp, Oudtshoorn, Graaff-Reinet, Willowmore, and to a lesser degree from Beaufort West, Riversdale and Robertson. Arrangements had been made for the free transfer of upwards of 300 men, chiefly coloured farm hands, to districts where their services were required. This work is still in progress and the good effect was already apparent, many hundreds of persons who had been in receipt of Government rations being now self-supporting.

Durban.

The Durban Bureau reports a brisk demand for labour of all kinds since the recruiting campaign was inaugurated. The demand for men ineligible for active service was satisfactory from the patriotic point of view, and also from the point of view of those who were "too old at forty."

The estimated value of buildings and plans approved by the undermentioned municipalities were: Johannesburg, estimated value of buildings and plans approved by the undermentioned municipalities were: Johannesburg, £13,237; Benoni, £13,598; Boksburg, £2,898; Germiston, £4,400; Krugersdorp, £2,584; Roodepoort, £2,000; Pretoria, £2,575; Springs, £2,130; Capetown, £1,100; Sea Point, £4,710; Kimberley, £2,500; Durban, £53,584. Tenders accepted by Government, £5,004.

THE AUSTRALIAN METAL EXCHANGE.

History and Objects of New Organization.

The preliminary conference called to discuss the establishment of a Metal Exchange in Australia has now concluded its sittings. In announcing the first meeting of the Exchange, Mr. Hughes, the Federal Attorney-General (now also holding office at Prime Minister), made a statement regarding the underlying principles of the policy of the Government and the rules of the Exchange. He said: "The conditions existing in the metal industry at the outbreak of war, and for some months subsequently, were at once a grave reflection upon the capacity of our race, an insult to our national pride, and a menace to our national safety. The domination of the metal industry in Australia by Germany was practically complete. A scheme of organisation, masterly, complex, and far-reaching, had been firmly established, by means of which the fortunes and developments of the industry were determined by German capital and influence, and its profits flowed into German pockets. This great German octopus, whose tentacles gripped the Australian metal trade, stretched throughout the world. Britain, France, Belgium, America, Africa, all were within its grip. Its power had long been tremendous, and daily was growing greater. And everywhere this great power was used to further Germany's national ambition for world power." To free Australia from this great combine was no easy task. Its power was very great, the interests at stake tremendous. Its influence was widespread, and manifested itself in unexpected quarters. And it had no scruples. When the war broke out Merton's was the trusted broker of the British Government; the selling broker of the whole Australian lead, Aron Hirsch; for copper, Beer, Sondheimer; and Merton's and Metallgesellschaft for zinc. Whatever metals Britain wanted she had to purchase from or through these German firms. Munitions, the life's blood of modern war, flowed into British hands through these polluted channels. After fourteen months of war, we are able to say, at any rate, that it does so no longer. The Australian metal industry is completely free from the grip of Germany. The trusted Mertons are no longer brokers for the British Government, Aron Hirsch and Beer, Sondheimer are no longer names to conjure with in the Commonwealth. Markets have been found for Australian products direct with Great Britain and the Allies. As a result of co-operative efforts, arrangements have been made which will ensure the refining of all Australian lead and copper ores in Australia. Negotiations are now proceeding which, it is hoped, will enable a very large proportion of the zinc concentrates of the Commonwealth to be distilled in Great Britain. The policy of the Government is to encourage the development of mining and of the metal industry, so that all ores produced in the Commonwealth may be treated therein. And above all, the policy of the Government is that the industry must not fall into German hands after the war. We are going to cut every trace of the German cancer out. The Australian Metal Exchange is the means through which these objects can be carried out. The principal rules of the Metal Exchange, which have been drafted by committees representing Melbourne and Sydney, embrace certain fundamental principles for safeguarding Australian interests and developing the metal industry of the Commonwealth. The principal rules are as follows:—

1. The Australian Metal Exchange is an association of persons, firms and companies engaged in the production, buying or selling of metals and minerals, whether as crude ores, concentrates or refined or partially refined metals or minerals.

2. The objects of the exchange are to exchange quotations, to facilitate the purchase and sale of metals and minerals in Australia, to provide for the registration of all contracts appertaining to their purchase and sale, treatment or refining of metals and minerals other than refined noble metals, the registration of metallurgical chemists and assayers, to maintain honourable dealings among the members of the exchange and to promote the interests of Australia and of the British Empire, in relation to the purchase and sale of metals and minerals.

3. No person shall be eligible as a member, active or associate, of the exchange unless he is a natural born British subject, and domiciled in the Commonwealth.

No person shall be eligible as an active member unless he is engaged in the Commonwealth in producing, buying or selling, or treating, or refining metals or minerals, or is the nominated representative of a British firm or British company so engaged. The definition of British firms or British company is given, and the Attorney-General of the Commonwealth may, at his discretion, grant a certificate of eligibility to any person, firm or company who may not comply with the rule. A renewal of such certificate may be obtained annually.

WRIGHT'S ROPES.

The best "Reef Traveller" is the *South African Mining Journal.*

THE WEEK IN THE SHAREMARKET.

Holiday Tone—Dividends and Output Satisfactory—Zaaiplaats Recover.

THE holiday on Thursday had the effect of damping business on the previous day, and the week has not been very eventful. The excellent dividend announcements were, of course, discounted, and the good November output merely confirmed belief in the sound position of the industry. All the gilt-edged dividend payers remain steady, and some prices continue to creep up. Barnato stocks remain in high favour, and all the Modder group on the dividend declarations are still sought. Zaaiplaats recovered a little, but there is not much doing in tin or diamond shares.

	Fri., 10th.	Sat., 11th.	Mon., 13th.	Tues., 14th.	Wed., 15th.	Thurs., 16th.
African Farms . . .	7 3	7 0*	7 3*	7 6	7 3	—
Apex Mines	5 6*	6 3	7 6*	6 9*	7 0*	—
Aurora Wests	8 6*	8 6*	8 6*	8 6*	—	—
Bantjes Cons.	4 9*	5 6*	—	5 6*	6 0*	—
Brakpan Mines	65 0*	65 0†	—	64 0	65 6B	—
British South Africa	—	—	—	12 0	—	—
Breyten Collieries . .	20 0*	—	—	20 0*	—	—
Cassel Coals	18 6*	19 0*	20 0*	20 0*	18 0A	—
Cinderella Cons. . . .	—	3 6*	3 6*	4 0*	4 0*	—
City and Suburbans .	41 0*	39 6*	—	40 6	40 0*	—
City Deeps	73 0*	72 6	72 6	72 6	72 6*	—
Cloverfield Mines . . .	6 2	6 0	6 0†	5 6*	5 9*	—
Clydesdale Collieries .	13 0*	13 0*	13 0*	13 6*	13 6*	—
Con. Investments. . .	—	13 6*	—	—	—	—
Con. Langlaagtes . .	35 6*	36 0*	36 9*	37 0	36 0*	—
Con. Main Reefs . . .	19 6*	19 6*	19 3*	19 6*	19 3*	—
Con. Mines Selection	12 9*	12 9*	13 9	13 0*	13 0*	—
Coronation Collieries .	25 0*	—	—	25 0*	—	—
Coronation Freeholds	0 3*	—	0 3*	0 3*	0 3*	—
Coronation Synd. . .	—	—	—	2 0*	—	—
Crown Diamonds. . .	2 0*	2 0*	—	2 0*	2 0*	—
Crown Mines . . .	60 0*	60 0*	60 0*	60 0	—	—
Crown Mines Debs. .	£98½*	—	—	£99*	£99*	—
East Rand Centrals .	3 0	3 0*	3 0*	3 0*	3 0*	—
East Rand Coals . .	2 2*	2 0*	2 0*	2 1†	2 1*	—
East Rand Deeps. .	1 3*	1 3*	1 2*	1 1*	—	—
East Rand Minings .	6 6*	6 6*	6 6*	6 6*	6 6*	—
East Rand Props. . .	21 0*	21 9	21 0*	21 6†	21 0*	—
East Rand Debs. .	—	—	£82½*	£82½*	—	—
Eastern Golds . . .	1 2*	1 2*	1 1*	1 2*	1 4†	—
Frank Smith Diamds.	1 5	1 4*	1 4*	1 5*	1 5*	—
Geduld Props. . . .	34 6*	34 6	34 6	34 9	35 6B	—
General Minings . .	7 0*	7 0*	7 0*	7 0*	7 0*	—
Glencairns	2 3*	—	—	2 0*	2 0*	—
Goerz and Co. . . .	15 0†	12 6*	—	—	—	—
Govt. Areas	28 6	29 0	29 0	29 0*	30 3	—
Jupiters	6 6*	6 0*	7 0†	—	7 0†	—
Klerksdorp Props. .	1 5*	—	1 4*	—	1 5*	—
Knight Centrals . .	11 2	11 2	10 11	10 9*	10 10*	—
Lace Props.	4 2*	4 0*	4 0*	4 0*	4 1*	—
Langlaagte Estates .	—	16 6*	—	—	—	—
Luipaardsvlei Est. .	—	7 6†	7 6†	—	—	—
Lydenburg Farms . .	6 2	6 1	6 0	5 10*	6 0	—
Main Reef Wests . .	6 1*	6 9†	—	—	6 0	—
Meyer and Charltons	107 6*	107 6*	107 6*	107 6*	107 6*	—
Middelvlei Estates .	1 3*	—	1 0*	1 0*	1 0*	—
Modder B.'s	120 0*	120 0	—	117 6*	118 0*	—
Modder Deeps . . .	113 6A	115 0†	113 0	113 0	—	—
New Eland Diamds.	8 0*	—	8 0*	—	12 0†	—
New Era Cons. . . .	7 0*	7 3*	7 0*	7 3*	7 6	—
New Kleinfonteins .	26 0	25 6*	25 6	25 0*	25 9A	—
New Modders	—	310 0†	302 6*	307 6A	300 0*	—
New Primrose	—	—	—	—	12 6†	—
New Rietfonteins . .	—	—	0 4*	0 3*	0 4*	—
New Unifieds	16 0	—	—	—	—	—
Nourse Mines	16 6*	—	16 6*	16 6*	16 6*	—
Pretoria Cements . .	—	46 0†	46 6†	—	45 0*	—
Princess Estates . . .	—	3 0*	3 0*	—	3 0*	—
Rand Collieries . . .	2 0*	2 0*	2 9*	2 0*	2 0*	—
Rand Klips	5 7*	5 6	5 4	5 3	5 5	—
Rand Nucleus . . .	1 4*	1 4*	1 4*	1 4	1 4	—
Randfontein Deeps .	3 3	3 3*	3 4	3 2*	3 2	—
Randfontein Estates.	13 3*	14 0	13 3*	13 9†	13 0*	—
Robinson Deeps . . .	21 0*	23 6†	21 0*	21 0*	21 0*	—
Rooibergs	14 9*	16 0	16 0*	15 9*	16 0†	—
Roodepoort Uniteds.	4 3	4 3*	3 6A	4 6*	4 6*	—
Shebas	2 0†	2 0†	2 0†	2 0†	2 0†	—
Simmer Deeps . . .	1 10*	1 9	1 9*	1 7*	—	—
S.A. Breweries . . .	32 0†	32 0†	—	32 0†	—	—
S.A. Lands	3 6	3 4*	3 2*	3 3	3 3*	—
Springs Mines . . .	34 3*	33 6	32 3	34 0	35 6	—
Sub-Nigels	10 9*	10 9*	10 6*	10 9*	11 0*	—
Transvaal Lands . .	11 6*	11 0*	—	—	—	—
Trans. G.M. Estates	26 6*	26 6*	—	26 6*	26 6*	—
Van Dyks	1 0*	1 0*	1 0*	1 0*	1 0*	—
Van Ryn Deeps . .	58 0	57 3*	57 0	57 3*	57 9	—
Village Deeps . . .	—	36 0†	—	—	35 0*	—
Vogel Con. Deeps .	0 6*	0 8*	0 8*	0 9*	0 10*	—
West Rand Cons. . .	8 6*	8 6	8 6	8 6*	8 6*	—
Western Rand Estates	1 0*	—	1 0*	1 0*	1 0*	—
Witwatersrands . . .	58 6	5 80†	51 6†	58 0†	55 0*	—
Wit. Deeps . . .	27 0	26 6*	26 6	27 0†	26 0*	—
Wolhuters	9 9*	9 9*	9 9*	—	10 0†	—
Zaaiplaats Tins . .	8 9	8 3	7 9	9 6	10 6	—
Transvaal Coal Trusts	45 6†	43 6*	44 0*	44 3*	45 9	—

* Buyers. † Sellers. A Odd lots.

Mr. J. M. Calderwood, M.I.M.M., expects to sail from England on his return to this country by the Walmer Castle, arriving here by the end of the month.

It is notified that the Commission of Examiners for Mine Managers' Certificates of Competency will hold the next examination on Wednesday, Thursday and Friday, the 19th, 20th and 21st January, 1916, at 9 a.m., at the South African School of Mines and Technology, Eloff Street, Johannesburg, and also simultaneously at Dundee, Bloemfontein, and Kimberley, if a sufficient number of candidates present themselves. The prescribed form of application for examination is obtainable without payment by applying to the Secretary to the Commissions of Examiners, P.O. Box 1132, Johannesburg.

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NEW YORK CITY, U.S.A.

Cable Address: "Pittsteel"

New Registrations.

SPECIAL AND EXTRAORDINARY RESOLUTIONS.

4280. Haenertsburg Syndicate, Limited, Johannesburg; liquidation.
2881. Margach and Wilson, Limited, Johannesburg; liquidation.
2491. W. Schroder, Limited, Johannesburg; change of name.
2491. W. Schroder, Limited, Johannesburg; change of name. liquidation.
4640. C. O. Thienhaus, Limited, Johannesburg; increase of capital.
1784. African Realty Trust, Limited, Johannesburg; increase of capital.
4580. Russell's Garage and Motor Works, Limited, Johannesburg:
2460. Sunday Times Syndicate, Limited, Johannesburg; increase of capital.
2273. Rand Daily Mails, Limited, Johannesburg; alteration of Articles.
3990. Bull and Oehmen, Limited, Johannesburg; change of name.
4628. Leicester Bioscope Cafe, Limited, Johannesburg; directors.
4554. Graaf's, Limited, Johannesburg; directors.
1092. Clifford Gold Mining Company, Limited, Johannesburg; liquidation.
4643. Cary's Limited, Johannesburg; agreement.
4580. Russells' Garage and Motor Works, Limited, Johannesburg; liquidator.
3192. Olympia Skating Rink, Limited, Pretoria; liquidation.
3485. Stock and Property Agency, Limited, Johannesburg; loans.
3656. The New Apostolic Church (Africa), Johannesburg; alteration of Articles.
4369. Market Square Pharmacy, Limited, Johannesburg; liquidation.

NOTICES OF INCREASE OF CAPITAL.

1784. African Realty Trust, Limited, Johannesburg; increased from £100,000 to £400,000.
4640. C. O. Thienhaus, Limited, Johannesburg; increased from £20,110 to £20,210.
2460. Sunday Times Syndicate, Limited, Johannesburg; increased from £200 to £256.

CHANGE OF NAME OF COMPANY.

2491. W. Schroder, Limited, to Landed Investments, Limited, Johannesburg.
3990. Bull and Oehmen, Limited, to Barford and Company, Limited, Johannesburg.
4190. Busfeldt, Limited, to The Mines Meat Supply, Limited, Johannesburg.

PROSPECTUSES.

4338. Co-operative Association of South Africa (Boksburg and District), Limited, Boksburg.

THE FOLLOWING COMPANIES HAVE BEEN PLACED IN LIQUIDATION.

4280. Haenertsburg Syndicate, Limited, Johannesburg; capital, £500, voluntary.
4580. Russel's Garage and Motor Works, Limited, Johannesburg; capital, £2,000, voluntary.
4092. Clifford Gold Mining Company, Limited, Johannesburg; capital, £20,000, voluntary.
3192. Olympia Skating Rink, Limited, Pretoria; capital, £4,000, voluntary.
1369. Market Square Pharmacy, Limited, Johannesburg; capital, £1,000, voluntary.
4524. Scott's Limited, Pretoria; capital, £300, by Order of Court.
4194. W. J. Morris, Limited, Pretoria; capital, £5,000, by Order of Court.

NOTICES OF CHANGE OF ADDRESS.

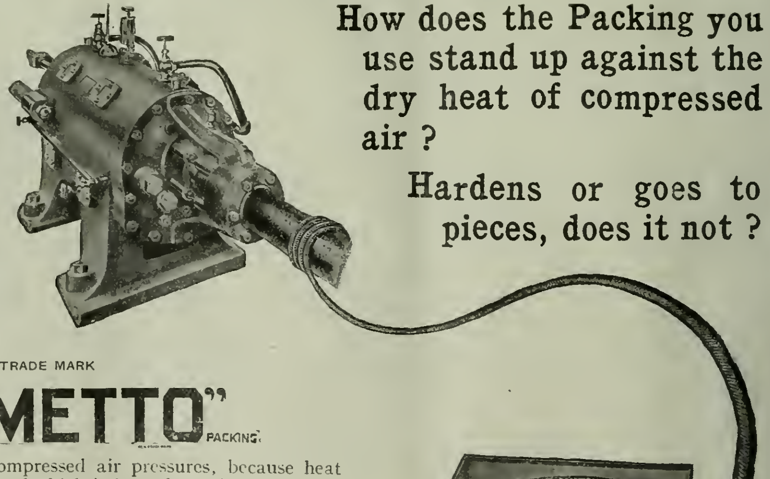
2983. Wilson and Company, Limited, corner End and Marshall Streets, Johannesburg.
4177. N. Smith Proprietary, Limited, 27, Goodman's Buildings, Commissioner Street, Johannesburg.
1517. The Consolidated Mines Selection Company, Limited (Foreign Company), care of F. R. Lynch, A. S. Pearse and W. S. Saunders, all of 201, The Corner House, Johannesburg.
2785. Eucrasy Company, Limited, Sussex House, Rissik Street, Johannesburg.
3072. New Thor Diamond Company, Limited, Lewis and Marks Buildings, President Street, Johannesburg.
3724. L. S. Smith and Brothers Typewriter, Limited, 6, Southern Life Buildings, Main Street, Johannesburg.
4658. Kensington Steam Bakery, Limited, 4, Argyle Road, Kensington, Johannesburg.
3935. The Diamantfontein Development Syndicate, Limited.

INVESTORS' DIARY.

FORTHCOMING COMPANY MEETINGS.

Jan. 14.—New Modderfontein (Special).

THE wonderful development and extensive use of compressed air makes the subject of a packing for air compressors a very important one, especially as the great heat incident to compression is dry and quickly destroys ordinary packings.



How does the Packing you use stand up against the dry heat of compressed air?

Hardens or goes to pieces, does it not?

TRADE MARK

"PALMETTO" PACKING

is especially adapted to compressed air pressures, because heat cannot destroy the materials of which it is made, and lubricant in each single strand keeps it soft and pliable in service.

It would be well for you to know the lasting qualities of "PALMETTO" under compressed air pressures, and a free working sample will convince you. May we send same?

GREENE, TWEED & CO., *Sole Manufacturers,*
41, TOTHILL STREET, WESTMINSTER, LONDON. S.W.

Carried in Stock by | BARTLE & Co., Ltd., Johannesburg.
| E. W. TARRY & Co., Ltd., Kimberley & Beira.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

American Competition—Indications of American Enterprise—Galvanised Iron Again Advancing—Rhodesian Orders Slackening Off—Electrical Small Bobbins, Phenomenal Rise.

There are signs the year end is upon us, therefore it is not surprising that the heavy side of business is waning, but not perhaps more so than at this time last December. Already the mining dividends are being declared, and as they are quite up to expectations and in some cases exceeding, it has created quite a cheerful tone in connection with our great gold mining industry, and its bid for requirements in the shape of mining material and machinery in the future. As intimated from time to time in these notes, there is a lot of rivalry, and even the term, trade jealousy, might be used as regards the hold that America has taken upon our markets in South Africa. The British agents naturally feel that they are much handicapped through the war, therefore when they lose an order through want of the material or price, it often brings forth a testy remark. However, be that as it may, we in South Africa can only accept the new situation created through the untoward circumstances over which we have little or no control. In justification of the previous remarks on this very important matter the position has been pretty well foreseen, but in particularly referring to the subject last week, it was not anticipated that Wall Street would so quickly give indications of coming up to anticipations. Now, during the week a Reuter's cable reported that Americans had commenced to buy South African mining shares, presumably because the New York commercial community has already recognised the valuable importance of sending abundance of manufactures and foodstuffs as well as a large and varied quantity to our ready money and short credit markets. If the ordinary merchants of America have been really "bitten" with the fact that this country will give them plenty of scope for their merchandise, why should not the financial magnates with their superabundance of war wealth also come and give our shares a turn and by and by perhaps they will form companies to exploit our mineral wealth and ranch lands. It is only common sense to state that if the Americans will catch on with South Africa and its present wealth, with the immense possibilities of the future, we shall hardly need to encourage immigration by Act of Parliament, as people will be tumbling over one another to come here and see and inspect for themselves. Without running away with the subject, it must be borne in mind that American Rails are said to have become somewhat stale as speculative counters, therefore it is not surprising to have received the cable referred to, about Wall Street nibbling at South African mining shares. In any case, this is no time for croakers, because if the people here cannot and will not bestir themselves to secure the riches, figuratively lying at our feet, then strangers will—as the world must have gold, and ever more and more, during as well as after the war, to say nothing of diamonds.

Iron, Steel, and Galvanised Goods.

The outstanding feature of the week has been the rise in galvanised corrugated iron, as well as, in a lesser degree, of all galvanised goods. A late cable was inspected from London reporting that corrugated iron was £25 per ton, and flat £23½, but no positive orders could be taken at those figures, as the market was rising with a nervous feeling about forward dealings. It is said that parcels of 200 and 120 tons respectively changed hands at 7⅝d. in Johannesburg upon receipt of the cables; however, the report goes that all of it was not in first-class condition. The current standard rate is 8½d. for 10 feet and under; 9d. for 11 feet; 9½d. 12 feet, all 24 gauge. Imported bar iron is also up and angle iron has risen 2s. 6d. per 100 lbs. and not easy to obtain at that price in quantities. According to a circular, an established firm of fencing makers has raised their price for the first time since the war. Taking one example, a crossing (fence) gate for a 15 feet opening is now 45s. as compared with the pre-war rate of 40s. A 3 feet opening, 1s. 6d. up; 9 feet, 3s.; and 12 feet, 3s. 9d.; and so on. By the way, there was a letter in our last issue in reference to wire, and it may be mentioned that barbed wire on the spot is from 20s. to 22s. 6d. per 100 lbs. coil, according to brand.

Electrical Goods.

Business is on the quiet side, and values are erratic, as large quantities of goods have arrived recently, but owing to contractors being only partially occupied some lines can be had cheaper, whereas others are up sky-high. For example, the Government wanted about five thousand small porcelain bobbins for telephone work, and the price for the balance jumped from 1s. 9d. to 5s. 9d. per 100, and it is more than probable that the full order has not yet been completed. During the week a consignment of 30,000 split bobbins arrived here from America, which is sufficient to keep the Rand going for three months. The actual position seems that the firms having the best assorted stocks, so that a miscellaneous order can be fully completed, are those doing the best business, which in any case is not any too good.

Few Items on Up Grade.

Nettlefold wood screws are dearer by being now only 20 per cent. off list. Dog spikes have risen 1s. per 100 lbs. Imported bar and angle iron, 2s. 6d. per 100 lbs. Mild steel up to 2¾d. lb. all sizes. Muntz metal and naval bronze, 3s. lb., and hardly obtainable. Brass and copper sheets, 2s. lb. Imported anti-friction grease, 21s. 6d. to 24s. 6d. Picks have risen 33 per cent. oversea, but very difficult to obtain here at any reasonable price.

Miscellaneous Trade Notes.

Baltic timber still on the up grade, especially in arranging forward contracts, but owing to the slackened demand deals can still be had at 9d. However, it is expected that should anything like a demand set in, the price, even for short lengths, will jump from a halfpenny to a penny per foot. Enquiries from Rhodesia are quite meagre as compared with six months ago, because at that time they were nervous about securing supplies, but now confidence is restored in that direction, therefore the most of their goods come as usual from the coast, and only special lines and spares are requisitioned from Johannesburg. A fair demand still continues for rails and piping, but 16 lb. tram rails are still very scarce indeed. On a visit to a plumbing works, some material then manufactured was displayed as being portions required for the munition works in Johannesburg. The exhibitor remarked that the hand grenades now in the course of manufacture were some of the best in the world. Mine chemicals are at about the same values, but very little doing indeed, as the daily requirements are taken from stock.

Revised Price List.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d., 19s. 6d. and 22s. 6d. (local do., 14s. 6d. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 2¾d. lb.; drill, 4¾d. lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per

100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8½d., 11 ft. 9d., 12 ft. 9½d.; 26 gauge, 6 ft. to 10 ft., all lengths about 8d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 30s. to 31s. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9d. to 9½d.; over, 9¾d. to 10d. (Oregon, 9⅜d.); flooring, 4½ x ⅞ and 6 x ⅞, 4⅜d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4½d.; pitch pine, 5s. 7d. per cub. ft.; Oregon, 4s. 2d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 8½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d.. truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 24s., boiled, 24s. per 5 galls.; white lead, 52s. 6d. to 54s. per 100 lbs.; turps., 46s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 26s.; do., 3/22, 24s.; tubing, 12s. to 13s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins 10s. to 15s. 100; cleats, 12s. 6d. per 100; P.O. insulators 18s.; motors, 3 h.p., about £30 new.

After the War: Two Views.

At the annual general meeting of the Phoenix Steelworks, Herr Beukenberg, the managing director, in the course of a long statement on the position of the company, made the following remarks:—"What the conditions will be like after the war cannot be conjectured at present. There is, however, no cause for great anxiety, although it is certain that our capital and that of many countries which are our principal selling markets is being weakened. The danger also exists that North America, owing to enormous profits her iron industry is now reaping, will be financially exceedingly strong after the war, and will, therefore, be able to compete with us accordingly in the world's markets. On the other hand, we have seen that neither North America nor England has succeeded in injuring us with our foreign customers during the war. In any case, in Germany itself there will be much work for our industry after the war, which will allow of no postponement, such as the repairing of permanent-way material and rolling-stock, the building of merchant vessels, and the reconstruction of the devastated districts. If the war ends as happily as we hope, the spirit of enterprise will also revive in the building trade." The following advertisement is translated from the "Kolnische Zeitung": " Business with Enemy Countries after the War.—After the conclusion of peace many German firms will presumably experience difficulties in creating or renewing business relations with enemy countries. Such difficulties may be minimised or removed *via* Holland, and an experienced Rotterdam merchant, not without means (formerly many years resident in Germany), places his services at disposal. He also undertakes to buy Dutch goods of which the export is permitted." Then follows the address of an advertising agent in Dusseldorf, to whom replies are to be sent.—*Ironmonger.*

Durban Roodepoort Gold Mining Co.,
LIMITED.
(Registered in England).

NOTICE is hereby given that an EIGHTY-THIRD (83) INTERIM DIVIDEND OF FIFTEEN PER CENT (15 o/o), equal to 3s. (Three Shillings) per share has been declared payable on and after the 21st December, 1915.

Holders of Shares to Bearer SHOULD PRESENT COUPON No. 83 for payment of the above 3s. (three shillings) per share, at the Standard Bank of South Africa, Ltd., Johannesburg Branch, on and after the 21st December, 1915.

W. A. MARTIN,
W. MACFARLANE,
L. CLARENCE,
G. S KEMPIS.
Local Directors.

Johannesburg, 19th November, 1915.

Printing, Bookbinding, Account Books, Tracing Cloth, Tracing Paper, Drawing Paper, Ferro Prussiate, Ferro Gallic, Indian Inks, Rubber Stamps, Stationery of all descriptions, Draughtman's and Surveyor's Requisites.

C. E FOLKEY, Stationer & Printer.

Ask for a Quotation for Stationery or Printing.

7, MARSHALL SQUARE BLDGS., opposite main entrance Stock Exchange
TELEPHONE 2065.

S.A. MINING YEAR BOOK.
1915.
By S. R. POTTER.
Vol. 1.

ANNUAL MEETINGS AND REPORTS COMPLETE.

"A complete account of the present position and future prospects of South African mines, put on permanent record for ready reference."—"The Star."

"The only authoritative work of reference on South African mining companies produced in this country."—"Rand Daily Mail."

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Obtainable from the offices of this paper.

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The Week's Meetings.

CONSOLIDATED GOLD FIELDS.

SOUND FINANCIAL POSITION.

Uninterrupted Progress.

The ordinary general meeting of shareholders in the Consolidated Gold Fields of South Africa, Ltd., was held on November 16th at the Cannon Street Hotel, London, E.C., Lord Harris, chairman of the company, presiding.

The Chairman moved the adoption of the report and accounts for the year ended June 30 last. He said: Gentlemen,—We will run through the accounts, taking the profit and loss account first. The net cost of management and other expenses in London, South Africa, and Paris is £12,229 odd, as compared with £21,969 odd—a very big drop, due to economies we have been able to effect, some of which we trust may be permanent, but, so far as it is due to such causes as our not having filled up the vacancies caused by the retirement of Mr. Chaplin and the death of Mr. Fricker, it can only, for the present at least, be regarded as temporary. We have not filled up Mr. Drummond Chaplin's place, but have promoted two of the local staff to be assistant managers to Mr. Douglas Christopherson, and we propose to see how this arrangment works for the present. In addition, the directors and members of the staff have taken up the work which was done by the late Mr. Fricker, formerly one of the joint managers in South Africa, whose untimely death we deeply deplore, and have by so doing materially helped to reduce the working expenses of Gold Fields. The arrangement entails a great deal of additional work on the gentlemen who have undertaken it, and I am not prepared to say that in normal times it will be possible for them to carry this extra work on their shoulders, as we anticipate

GREATER ACTIVITY IN OUR BUSINESS

on the cessation of hostilities. Subscriptions and donations are £3,614 odd, as compared with £2,163 odd. The increase is due to the donations we have given to various war funds, which you assented to at the last meeting, and we should be glad of your authority to repeat approximately the sum of these extra subscriptions. We have paid heed to your request that our contributions were to be limited in extent, and many appeals made to us in the past year have, in deference to your wishes, been refused. The debenture interest is, of course, down, due to drawings. On the other side, by dividends, profits realised by sale of investments, etc., we have £323,246 odd, as compared with £421,825 odd, the difference being due to the fact that the former is a net figure after allowing for some £97,000 written off, whereas the figure for last year was that before any allowance for depreciation was made. It seems to have been assumed that nothing was written off for depreciation this year, but I would call your attention to the customary expression in the profit and loss account, "less amounts written off." The amounts written off this year are insignificant as compared with those which we have had to write off of late years, but they do nevertheless amount to some £97,000 odd. In this connection you will have noticed that we have not made up our accounts on the lines of many of the big financial houses—that is, to take the prices of July 27, 1914, the last "official making up" under the old conditions, but have used the prices of the close of our financial year, to which we have written down our quoted investments. Although this meant declaring a smaller profit, it is, in our opinion, a more conservative course to adopt and provides more security for the future. The revenue is almost entirely due to dividends. I think we may congratulate ourselves on our principal interests being in

THE PRODUCTION OF GOLD

—(hear, hear)—a commodity which all the world needs, though I imagine that our enemies would have been happy if they could have succeeded in interfering with the production of gold; but the parties interested in producing it and safeguarding it in transit have worked with great harmony, and our enemies' efforts, whatever they were, to interfere with these operations have been unsuccessful. That gives us, after deducting for depreciation £97,142, £299,151 odd to bring down to add on to the carry forward of last year of £84,471 odd, giving us £383,623 odd, as compared with £600,583 odd last year, which, however, included £150,000 transferred from reserve. From that amount have to be deducted the interest on the first and second preference shares, amounting to £150,000, and the French Government duty, leaving us to carry to the balance sheet £230,088 odd, as compared with last year, £84,471. Out of this we feel ourselves justified in recommending you to take for dividend £150,000. This, I hope, makes up to you for the disappointment you suffered last year, when we felt compelled to pass the final dividend. We were much criticised for that policy, but we feel satisfied that, under the circumstances then prevailing, we exercised in your interests a wise caution. I shall be able to show you that we are in a

SOUND FINANCIAL AND LIQUID POSITION

—(applause)—enabling us, if necessary, to be of material use in supporting the Government. Turning to the balance sheet, the capital is unaltered and the reserve, amounting to £800,000, is also unaltered. The debentures have been reduced from £175,000 to £150,000. The Simmer and Jack East second debenture guarantee has been reduced by the proportionate value of interest paid during the year, namely, £15,939 odd, as compared with £119,543 odd. We have made an offer to purchase the remaining interest coupons of these debentures, and our offer has been in a large majority of cases accepted. Provision has been made for this purchase by the guarantee fund, so that no new debt against profits of the current year is caused thereby. Sundry creditors are £216,312 odd, as compared with £742,245 odd, the difference being due to our having repaid moneys we had borrowed which, under existing circumstances, we could not profitably employ. The preference dividends have been paid, and provision is made for those that have accrued to date, also for the debenture interest. Contingent liabilities now stand at £544,701, as compared with £752,642 odd. No less than £400,000 of this is a liability on Gold Fields American ordinary shares, and it is unlikely that we shall be called upon to find this sum, or even any large portion of it. On the other side,

SHARES IN COMPANIES

at or under cost stand at £3,770,651 odd, as compared with £3,799,065 odd, and here I ought to refer to a slight change in the wording of the auditors' certificate. For some years they have used the expression "and in no case over market prices where quoted on June 30 last"; but this year, to enable them to fall in with the new conditions, they state "and in no case over the Stock Exchange markings where quoted up to and including June 30 last." Investments on account of reserve, including Exchequer bills, are £384,296, as compared with £327,642 odd, the balance being invested in the company's business. There are now no loans at short call, which was the old entry. The entry is for pre-war Stock Exchange loans, the total being £385,763 odd as compared with £1,163,897 odd, the indebtedness of the company, therefore, having been materially reduced during the year. The decrease calls for special comment, seeing that under the Treasury regulations brokers were entitled to continue their loans until six months after peace, whereas they have in fact paid off no less than 67 per cent., a tribute to the soundness of the business in normal times, to the desire of brokers to take no unnecessary advantage of the Treasury regulations, and a proof that the public are doing their best to take up their commitments. Sundry debtors are £244,651 odd, as compared with £199,474 odd. Cash advances and mortgages are £809,749 odd, as compared with £604,369 odd, the difference being principally due to loans to the Rhodesian Company. Real estate and buildings stand at £105,887 odd, as compared with £120,000. Cash at bankers and in hand figures at £318,744 odd, as compared with £229,894 odd. As regards

THE CASH POSITION,

taking the usual figures on each side, we get £1,337,782 odd, as compared with £1,269,609 odd, showing an improvement under this head of £108,172 odd and a strong liquid position, as I just now claimed, in addition to which we have increased our gilt-edged securities by some £56,000. The year, of course, has been replete with incident. Our industry might have been materially affected by the war in Europe, very much possibly to the rebellion in South Africa, which was so promptly scotched by General Botha —(applause)—to whom for his remarkable capacity as a general as well as a politician we owe our admiration, and partially by the war in South-West Africa, and as regards the future it might have been seriously affected had not the result of the election to the Union Parliament have been so satisfactory in assuring a majority in favour of law and order and the maintenance of British supremacy in South Africa. (Applause.) But, thanks to the loyalty of the mines staff and establishments, and to the satisfactory state of native labour supply, the roar of the mills has been as persistent as the roar of the guns, and we may regard the mining operations of the year as practically normal. Of course,

MINING COSTS DO NOT DECREASE.

The rise in the price of commodities and chemicals and increased taxation in various ways have affected profits, and may do so still more when the interest on the amounts borrowed by the Union Government for the purpose of its warlike operations has to be met. On the other hand, we may be hopeful that the improvement in the supply of native labour will be permanent and that the distribution of native labour to the mines, due to the rearrangement of complements, will enable the Jupiter and also the Sub-Nigel to help our revenue. It is also satisfactory to be able to report that, after some years of negotiations, terms have been arranged with the proprietors of Booysens Estate, and that a prolonged life has been secured for the Robinson Deep Gold Mining Company. I do not think you can be sufficiently grateful to Mr. Birkenruth, who, with much patience, has eventually found a solution to a most difficult problem. (Hear, hear.) I must devote some little time to this matter, in the first place, because it is of particular interest to you, seeing that you are interested as shareholders in both companies to a very considerable extent, your holding in the Robinson Deep being to-day about 41 per cent. of the total capital, while in Booysens and South Deeps, which for convenience I refer to as Booysens, you hold a 51 per cent. interest; and, secondly, because the Board of Gold Fields was again in this matter, as in the sale of Simmer East to Knights Deep, in the position of an interested party on both sides, and we had to act, and we hope and believe we have acted, the part of honest brokers. I hope that the very few shareholders of the Robinson Deep, representing only 4,633 out of 1,000,000 shares, who have objected to the scheme, will recognise that we have been strictly impartial. Our duty to the Robinson Deen shareholders was no more and no less than our duty to yoursolves as shareholders in Booysens and South Deeps, but we came to the conclusion that the promotion of your interests as shareholders in Booysens depended upon our being able to place an entirely fair and equitable proposal before the Robinson Deep shareholders. The essential need of the Robinson Deep was longer life, security of working, and facilities underground for elbow room and ventilation. The advantages possessed by Booysens were the large claim area on which, upon

AMALGAMATION WITH ROBINSON DEEP,

the sinking of a shaft or shafts would ensure that security of working which, in the opinion of the Robinson Deep directors, might conceivably be in jeopardy in the future. Agreement as to the relative value of the Robinson Deep, with all its assets, on the one hand, and that of Booysens on the other, was, I need hardly say, not arrived at without difficulty, and even then, only with a very important reservation in that the engineers representing the 49½ per cent. Booysens interest claimed a higher value for the Booysens ore contents than the Robinson Deep engineers would concede. Finally, it was found possible to obtain for the Robinson Deep shareholders preferential rights to the same amount of profit as they would have realised during 8½ years' independent working, plus distributable profits in addition thereto, amounting roughly to £870,000, extending over 25½ years, and this bargain was only clinched upon these preferential rights being made cumulative. The full details have, of course, been in the hands of the respective shareholders for some time, and I need not, therefore, enlarge on them now; but I think we may justly claim that the interests of the Robinson Deep shareholders have been fully protected. Obviously, exception could be taken to any scheme which might have been proposed, and it is, therefore, not surprising that some of the Robinson Deep shareholders have objected. In these cases the Transvaal Companies Act protects them on the same lines as the English Companies Act—namely, they are entitled to have their shares paid out to them in cash on a valuation fixed by an independent arbitrator—and I may further say that they have had an opportunity of selling their shares in the open market, and, as the market is no mean judge of the intrinsic value of a mining share, these shareholders are suffering no great hardship at the hands of the overwhelming majority—as the results of the meeting held on the 11th inst. show—who have preferred to accept these proposals. Now, having, as we claim, acted fairly by the Robinson Deep, I turn to the

ADVANTAGES WHICH GOLD FIELDS

will reap from the conversion of their present Robinson Deep holding into these cumulative preference shares and by the fact of their Booysens and South Deeps holding being put on a share basis—that is to say, on a marketable or revenue-producing basis. As regards No. 1—that is to say, in lieu of a revenue estimated at an average of £71,750 per annum for eight and a half years on their present holding—in other words, a total distributable amount of £609,875—they will receive by way of the exchange into cumulative preference shares the following income: £82,000 per annum for four and a half years from the 1st of July, 1915; £30,750 per annum for 17 years thereafter; £25,500, £15,500, £15,500 and £5,100 for the last four years respectively, or, including the 1s. per share redemption, a total distributable amount of £963,700. This is an advantage which is, of course, shared proportionately by all the shareholders agreeing to the scheme. As regards No. 2, the Consolidated Gold Fields will receive about 341,000 ordinary shares in the new company for their Booysens and South Deeps interest, which includes consideration for their share as part freeholders; and as these shares may be expected to earn revenue within about four years from date, it will be seen that what we hope will prove to be a considerable revenue from these shares is in prospect. If these ordinary shares secure a revenue after four and a half years equal, let us say, to that reserved to the Robinson Deep shareholders by means of the preference shares, we shall be quite satisfied. If, on the other hand, the revenue should come to more, then we think it only fair that the Robinson Deep shareholders should have the chance of

SHARING IN ANY EXTRA PROSPERITY

we may experience, and it is for that reason we have given them the option of exchanging one-half of their preference shares into ordinary shares after four and a half years from July last. It seems to us that they will have an opportunity during these four and a half years of judging whether it would be advantageous to them to make this exchange. I hope I have not wearied you with this long explanation, but, as the successful issue of this amalgamation will have quite an important bearing on the revenue of this company for many years, I have thought it appropriate to lay some stress on the transaction. It should be of special interest to the holders of our company's preference shares, seeing that the income from our prospective holding of "A" and "B" shares in the new Robinson Deep Company alone should, so long as we continue to hold these shares as an investment, and all is going well, provide us with about one-half of the amount required for the first and second preference shares interest service for some 25 years to come, and if, as is quite possible, the Robinson Deep Company should eventually acquire the Turffontein Estates, the life of its mine and of the "B" shares will be indefinitely prolonged. To conclude, I should like to add that, in fathering this scheme, we have not been unmindful of the fact that it was undesirable, if it could be avoided, to allow the Robinson Deep to terminate its existence a few years hence, and that it might have been unwise, from the Robinson Deep shareholders' point of view, to delay in coming to terms with those Booysens and South Deep interests which are outside the control of this company. We know that the Village Deep is opening up very satisfactorily on one side of Booysens and the Crown Mines on the other, and we do not know what inducements the Booysens shareholders, ourselves included, might not in the future have been offered to join some other combination of interests. It is your interests, gentlemen, which are paramount with us, and we think that, acocrding to our lights, we have done the very best for you, both in your capacity as shareholders in Robinson Deep as well as in Booysens, and whether that is so I must leave to your good judgment. As regards

RHODESIA.

I have so recently spoken at considerable length to the shareholders of the Gold Fields Rhodesian Development Company on its affairs that I need not detain you further than to point out that the Shamva Mining Company has been satisfactorily placed on a dividend-paying basis. The receipts from that company and the repayment of loans from the Antelope and from Falcon Mines are enabling Gold Fields Rhodesia to considerably reduce its debt to us, improving thereby our liquid position. At the same time it must be understood that the mining staffs in Rhodesia, owing to the patriotism of many of the members, have been depleted, and that mining is carried on in that country with considerable difficulty. This, added to the many new problems incidental to mining and the treatment of ore, necessitates the greatest vigilance from the engineers and managers. Gold mining in Rhodesia is an entirely different proposition from the Rand, where, owing to the practical certainty of the life of a mine and the gold being easily extracted, there are fewer difficulties which have to be faced than where ore is refractory, and where different methods for extracting it have to be considered before one can be certain of securing the gold. As regards the investments of the

GOLD FIELDS AMERICAN COMPANY,

you will see from Baron de Ropp's report, and from our own report, that most of the companies are doing quite well, but, of course, the interesting question there is, What is the American Trona Corporation going to do? We experimented first of all with a process which proved, after a fair trial, to be unsuccessful, or, rather, too expensive and wasteful for adoption, and we have now reason to believe that the process which has been substituted will be entirely successful, besides being more economical. It is not a difficult process, and has only to be adapted to the special climatic conditions of the country where the Lake is situated. A very elaborate trial of the brine was carried out during the summer by an independent firm of chemists, and the results have been reported on by capable referees so encouragingly that the company felt justified in ordering the plant, which, I am happy to say, is of a standard type, and at present it is anticipated that potash will be produced next year—the most optimistic hope in the earlier months—when we shall most probably still have the advantage of the high price obtainable for potash at the present moment. All the work necessary to secure the company's title to the area located in accordance with the mining laws of California is being carried out, with the view to obtaining an indefeasible title from the United States authorities. These proceedings necessarily take time, but our legal advisers inform us that they have no doubt that such title will be granted us in due course. As regards

WEST AFRICA,

I am afraid I have nothing encouraging to say. There are a few successful companies, but the mineralisation is unquestionably of a disappointing character, and the cost of extracting it is too great to encourage any further outlay of capital. As regards outside ventures I am glad to say that in the case of the Anglo-Colombian Company, in view of the satisfactory evidence of the existence and value of the deposits, which has been derived from an extensive system of boring and shaft-sinking over a very large area, one dredge has been erected, and has been in operation since about July, and the results obtained fully justify our considering ways and means for producing gold and platinum on a larger scale by the provision of more dredges. The company is taking expert opinion as to the provision of power for these operations, and I should hope that it will shortly have sufficient evidence to enable it to elaborate a large scheme of operations. As regards oil, our prospects in Mexico are excellent, if only that unhappy country would settle its political differences. The companies in which we are interested are producing and selling oil enough to show encouraging profits, and from the indications given by the wells working compulsorily at a very reduced outflow, one is quite entitled to believe that the properties are capable of a very large production. In Trinidad we understand the company in which we are interested has received encouraging assurances that the very fine oil which is produced from these deposits will readily find a sale as soon as the pipe line, at present under construction, is completed. I should be failing altogether in a proper appreciation of the public spirit that has animated the officials and employes of the Consolidated Gold Fields and of the companies in which Gold Fields is interested if I did not inform you that, in addition to the large proportion of our younger men in London who joined the Colours last year, there has been an approximately corresponding

ENROLMENT FROM THE STAFFS

and establishments, administrative and mining, in South Africa. Neither position nor emolument has deterred men from either rushing Home to help the Old Country when she was in danger or joining in the expedition against South-West Africa. (Applause.) No less than 472 have joined the Colours from the Transvaal and 175 from Rhodesia. (Applause.) Mr. Tulloch, of the Golden Kopje Mine, has won the Military Cross. (Applause.) Very large contributions, amounting, I believe, to no less than £15,000, have been made by the staff and mine employes to the war funds. (Applause.) We thought it would be your wish that these should not be altogether losers by their patriotism—(hear, hear)—and we have therefore made in each case grants appropriate, we hope, to the conditions of engagement, and the terms and length of each man's service, in order to compensate them to some extent for the loss of their civil emoluments. (Applause.) The result of this reduction in the staff and establishments has, of course, produced a saving from the normal expenditure. This we have utilised to some extent by improving the pay of those of our clerical establishment who could satisfy us that they had suffered by the increased cost of living. In both these matters I invite, and feel I may depend upon receiving, your approval. (Applause.) I regret to say that I have to report

SOME CASUALTIES

—three deaths and four wounded. I am sure you sympathise with those who are bereaved by the former, and with the others who have suffered from their wounds. (Hear, hear.) And now I come to what is a unique case. One of our principal officials has been permanently invalided after giving us over 26 years of devoted and valued service in the transfer department. We have no provision for pensioning old employes—not for want of consideration of the subject, but from the difficulties surrounding the establishment of a scheme in the case of a company started, as this was, under the very abnormal conditions of the nineties. We ask you to approve our giving this gentleman a compensatory allowance for a limited terms of years, gradually decreasing after the first year. I may say that the only precedent we have to help us was on these lines. Considering the terrible disturbances of the world, I should hope, gentlemen, that you think that the result of our year's working has been on the whole satisfactory. (Hear, hear.) It has, of course, been due almost entirely to the fact that Great Britain is

STILL MISTRESS OF THE SEAS

—(applause)—and that we have been able to market our gold as well as to produce it. London remains the gold market of the world, and the opinion of your directors is that we should make every effort to secure that that shall remain unaltered. Temporary demands may arise from this or that part of the world. There is always, for instance, a great demand for gold in India, but what we have got to think of is a free market with a stable price in which we can be perfectly certain of being able to sell our gold month by month. That is secured for us by means of the Bank Acts, and whatever may be the fluctuations of exchange, however novel may be the demands for this or that commodity which may arise in consequence of the gigantic operations of war, I think that, so far as our interests are concerned, and those of other gold-producing companies, we may be thankful that we have that free and stable market in England protected by our powerful Navy. Applause.) To turn again to general matters it must not be supposed that we have not had to face many and varied difficulties arising owing to the war. Careful thought has had to be given to the arrangements for supplies of various kinds, without which the industry would have come to a standstill, and I may mention that our office in New York was able to be of very considerable service on this matter, while at the same time earning a commission for the Gold Fields American Company. The question of

SKILLED LABOUR IN THE TRANSVAAL

has, too, given us much food for thought, and I cannot conclude better than by quoting from a letter received recently from Mr. Christopherson in Johannesburg. He writes: "The mining companies have been handicapped by many efficient men having gone on active service, both underground and surface men. Among these were a large percentage of shift bosses, and consequently supervision suffered just at a time when the mine had to replace experienced employes by men with less experience. Nothing but the willing co-operation of all enabled the gold output to be maintained, and even increased; and profits were not materially reduced. Naturally, with the labour force now at the disposal of the industry, had times been normal, the profits would have been very much higher. Had it not been that this industry was an industry for the production of gold, so essential to our country, I do not believe it could have been kept going at anything like the magnitude it is to-day, because the men would not have stopped. They would have flocked out to offer their services in a more direct way to the Empire. There are thousands here working only because the disposal of gold rests with England and is essential to the Empire." (Applause.) Can I offer you a more suitable peroration than that, through the patriotism of its employes, the company has done its bit? (Applause.) I now move: "That the report of the directors and statement of accounts and balance-sheet to June 30, 1915, and the recommendation of the directors that a cash dividend of 7½ per cent., free of income-tax, be paid on the 2,000,000 ordinary shares of the company, be adopted."

Mr. S. Christopherson seconded the motion, which was carried unanimously.

The Chairman next proposed the re-election of Lord Brabourne, Sir Leigh Hoskyns and Colonel E. Frewen, the retiring directors.

Mr. J. C. Prinsep seconded the motion, which was unanimously adopted.

On the proposition of Mr. Pearson, seconded by Mr. Skeel, Messrs Turquand, Youngs and Co. were reappointed auditors.

Engineering Notes and News.

S.A.I. of E.E. Annual General Meeting.

The seventh annual general meeting of the South African Institute of Electrical Engineers will be held at the School of Mines Building on Thursday the 20th January, 1916, at 8 p.m. In accordance with the Constitution and Rules, it will be necessary for all nominations for officers and council, to fill the places of those who retire at the end of the year, to be in the hands of the Secretary not later than the 20th December. Members are notified that a declaration will be made at the meeting on the 14th instant, that the Council has unanimously elected Prof. William Buchanan, B.Sc., Whit.F.C., A.R.C.S., M.I.E.E., as President for the year 1916. The Safety Precautions Committee of the Institute would be glad to receive from members, through the Secretary, details of any unusual accidents resulting from electrical causes, which may have occurred in their experience, together with any suggestions they may like to offer for the prevention of similar accidents in the future.

Ford Motor Cars.

The *Evening News* recently announced that it was excluding the advertisements of the Ford Motor Car Company. Mr. Ford is one of the most fervid supporters of the Kaiser and all his works. During the flotation of the Allies' £100,000,000 loan in the United States Mr. Ford is reported to have declared:—" If I find that any banks in which my company have deposits participate in the proposed loan to the Allies, I shall immediately close our accounts. I won't have any part of my personal funds or the Ford Company's funds, directly or indirectly, aiding the flotation of this loan. If I had my way, I would tie a tin can to this joint Anglo-French Commission, and chase it back to Europe." It will be noticed that this arrogant admirer of Kaiserism compares the British and French nations to a mad dog. The British and French peoples should know how to deal with a dollar-dictator of that type.

Psychology of Advertisements.

[By P. B. MCDONALD.]*

A mine-manager is reading a mining weekly; he reads first a well-written and suggestive editorial; then he turns to a special article on a subject in which he is interested, signed by a name that he knows insures lucidity of thought; he next scans a news-letter from a mining centre, and then——then he reads the advertisements! If the subscribers to the mining periodicals did not read the advertisements, the latter would soon cease to be published.

The mine-manager reads two or three advertisements carefully and thoughtfully; they describe products of which he has heard and which he thinks of introducing at his mine. Perhaps they are electric locomotives for underground haulage, or ball-mills, or drill-column hoists, or mine-telephones, or dump-cars, or filters, or rope-drives, or ore-crushers, or conveyors. What the manager is thinking is this: " Will they do our work satisfactorily; I wish I knew more about them; what's the idea of this particular type? for what purpose is that handle? how is regulation effected?" It is true that a note in the corner of the page states that pamphlets or catalogues describing the product will be sent on request. But a mine-manager is a busy man and has but little time to give to each machine with which his mine is equipped. Moreover his experience with advertising pamphlets has been that they are less understandable than a railroad time-table and such a mixture of haphazard facts mixed with blatant boastings that only a Philadelphia lawyer can distinguish where one begins and the other ends. It is passing strange that a manufacturer who pays for a page of advertising does not use it to tell the readers what they want to know about his product much as he would do if he were talking to them. Instead the page is used for printing in big letters exaggerated statements of the " live-wire " variety, full of " punch," which mean nothing in particular, and which nobody believes.

After studying two or three advertisements carefully, the mine-manager examines several others hastily. They are advertisements of standard products that need no explanation. Their appearance in the advertising pages is the equivalent of a pleasant meeting with an old friend. Seeing the advertisement every week assures him that the manufacturer is alive, and encourages the feeling that the product is well made; at least that it is not deteriorating. A certain part of the manager's thinking as he slowly turns the advertisement pages is unconscious. He reads the names of the various articles advertised and the addresses of the firms selling them, while sub-conscious impressions are being recorded in his brain. The repeated seeing of the advertisements of any particular article will inculcate a belief that the article has merit; and when the time comes to buy, the advertised product will loom up as the sort that is wanted, the superior variety of assured excellence and quality. This is the great, silent argument of advertisements, the conception and growth of confidence in the product, the quiet instilling of belief in its usefulness, the feeling that here is worth and satisfaction. When an article has been advertised steadily and then the advertising is stopped, the thought quietly spreads that the product is declining and that the firm is perhaps losing its position. The former feeling of confidence and optimism in the product becomes replaced by the suggestion that all is not well with the manufacturer, and doubt is manifested as to the ability of the firm. Something appears wrong somewhere, and the goodwill diminishes. The advertiser in a technical journal should distinguish between the sort of man he is trying to impress and the people for whom articles are advertised in popular magazines. Advertisements in the latter are intended to appeal to a gum-chewing public that knows little and cares less about realities. Mine-officials and engineers, on the other hand, are picked men of unusual keenness and ability, men distinguished from the public that giggles in picture-theatres by years of training, experience, and the consideration of serious problems. An advertisement that might be believed by the readers of a weepy magazine would only awaken amused contempt from a mine-superintendent who has been trained to see things as they are, and who is not at all impressed by " live-wire " nothings or glorified " punch." Yet the ordinary mine-official is constantly on the watch for new machinery and equipment that will save labour or expense, and he is always open to suggestions and arguments that are backed by the logic of facts. He likes to be addressed by the advertiser as if each knew their own business: the serious unpretentious talk of one sensible man to another, not that of a corn-doctor to a passing mob. Mutual confidence is the first requisite to the transaction of business.

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* In the *Mining and Scientific Press.*

"SKEFKO"

BALL BEARINGS.

'Phone 835. **Johannesburg.** Box 654.

THE SOUTH AFRICAN

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NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 2d.

CONTENTS.

PAGE

Notes and News 387

Topics of the Week:

- The Mining Industry 389
- South African and Australian Industries 390
- Coal Economy 390

The East Rand—I. 391

Correspondence and Discussion: "Karoo Coal Prospects"; "Dormant Mines of the East Rand" ... 392

Transvaal Gold Mine Dividends 393

Position and Prospects of the Witbank Colliery 394

"Gold Fields" Annual Review of Rand Mining—II. 395

The Vereeniging Power Station—II. 397

Trading with the Enemy: New Bill 399

Rhodesian Section:

- Latest Mining News 401

The Week in the Mining Material and Engineering Trades 403

The Week in the Sharemarket 405

Engineering Notes and News 406

Company Meetings: Breyten Collieries; Carolina Asbestos; Elandsfontein Estate; S.A. Alkali ... ii.

Notes and News.

The Demand for Antimony.

The demand for antimony has led purchasers to look as far afield for their requirements as South Africa, and we should like to draw the attention of producers to the advertisements referring to this matter which appear in another part of this issue.

* * * *

Northern Alluvial Tins.

The operations of this syndicate have, we understand, been suspended. The original scheme for small workers at Vaalbank, on the Elands River, fell through, and the option lapsed to the previous owners. The death of a prominent member of the syndicate led to considerable difficulty in the carrying out of the plans originally proposed, but we have no information as to the probable future standing of the concern. This will serve as a reply to various enquiries which have been addressed to us concerning the syndicate by those who have felt interested in its development.

* * * *

Extra Lateral Rights.

That fruitful source of legal contention and technical argument that has occupied the attention of the Courts in the United States almost incessantly for years without number, and was introduced into the mining laws of Rhodesia, as some say, at the instigation of Mr. Hays Hammond, is now revealing its peculiarities to the shareholders of the Amalgamated Properties of Rhodesia (1913) and of the Globe and Phoenix Gold Mining Company. The former company, as plaintiffs, it may be remembered, allege that in 1912, when the defendants bought the John Bull claims in Southern Rhodesia, they agreed to hand over to plaintiffs one-half of all the gold they abstracted from these claims. Defendants had mined beneath the John Bull block, which adjoins the Phoenix block, and taken out over £400,000, of which plaintiffs claim one-half. Defendants repudiated the agreement, and allege that the gold was obtained from the Phoenix discovery reef, which runs under the John Bull claim, and is continuous, and which they followed by virtue of their legal right of extra lateral pursuit. When the last mail left England the case had been running, already, three weeks, and with Mr. D. P. Macdonald, of the S.A. School of Mines, in the box was still "going strong."

* * * *

Kick's Law Again.

The persistence and courage shown by Mr. H. Stadler in asserting and defending his views with regard to the mechanical efficiency of crushing are no less characteristic of him now that he has transferred his activities to another part of the world. The last *Mining Press* to hand contains a spirited letter by him, *more suo*, upon the subject, upon which the editor comments thus:—"The discussion columns are enlivened this week by a letter from Mr. H. Stadler replying to sundry comments and criticisms on his paper explaining the mechanical efficiency of crushing. Certainly he makes a crushing rejoinder, illustrating an extreme phase of the law of Kick, of which it may be said that it is more truly 'Stadler's theory' than what is commonly known as Kick's law. Whether Rittinger's theory, on the other hand, is 'the law of cracks, or cranks' we leave Mr. Stadler's opponents to decide, but it is quite evident that either form of statement is beyond the reach of apparent typographical error. We submit that Kick's law, or the law of Kick, is being stretched to 'the elastic limit' and that it may lead not only to the fracture of prisms but to the cracking of the cocoa-nut that crowns *homo sapiens*. However, we are grateful to Mr. Stadler for giving a touch of real life to our pages. We undertake to respond for Messrs. Kenney and Del Mar so far as to say that both of them, of course, would have been highly offended if Mr. Stadler had 'completely ignored' them: indeed, the measure of their gratification will now overflow, seeing how thoroughly he has attended to them. Yet we hasten to say that Mr. Stadler is personally known to the present writer as a diffident and amiable investigator who always leaves his gun at home on the piano when he attends a scientific meeting. He is the quietest mannered man that ever sunk a submarine or exploded a mine under a hostile battalion. And what is much more to the point he understands his subject and is as keen in the search after truth as a golfer after a lost ball. Therefore, gentlemen, Messrs. Kenney and Del Mar, count twenty before you reply; please make your counter-attack without the use of chlorine gas, hand-grenades, bombs, or any weapons not recognized by Hoyle, Cavendish, or the other authorities on the game."

* * * *

Messina.

The report by Mr. A. F. Kuehn upon the mining position of the Messina Company, which was quoted in the last issue of the *S.A. Mining Journal*, was the subject of some discussion at the annual meeting of the company which was held in London on November 25, Mr. H. C. Hoover presiding. The Chairman said, *inter alia:* "As to the position of the mine itself, there was some difference of opinion as to the position and value of the ore reserves, and Mr. Kuehn was sent out to check the matter. Mr. Leslie said that he was somewhat disappointed with Mr. Kuehn's estimates, and that, in his view, was the weak point of an otherwise magnificent position. They were taking energetic steps, now that the financial position admitted of this policy, to develop the mine itself and some adjacent prospects on the property. It was too early to speak of results at present, but the prospects were quite promising, and they had great hopes of improving the position of the ore reserves by these means, because Mr. Kuehn had not in his estimate of the reserves included any tonnage for increase in depth or laterally, or for surface prospects. Owing to improved metallurgical methods, they were obtaining more copper from the same amount of ore and, owing to decreased ore reserves, additional capital expenditure must be curtailed to its smallest possible dimensions. The question, therefore, of erecting a smelter had vanished. There were some points about the future which they had to keep steadily in mind, such as the taxation question, the contingent liability under the railway guarantee to the South African Government, the redemption of debentures, which commenced next year, and the current financial requirements of the company under present uncertain conditions. The question of dividend must be subservient to all these considerations. They were hopeful, however, that in the early part of next year it would be possible to declare an interim dividend, should no unforeseen change in the position take place."

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S. A. Salt Deposits.

In the issue of *The Engineering and Mining Journal*, dated the 23rd October last, Mr. E. Mackay Heriot has an interesting article on Potash Deposits, in which he discusses the question of the origin of saline beds. The object of the article is to consider the probability of the discovery of potash in other countries than Germany, and a perusal of it suggests to us that a study of the saline deposits of South Africa affords a subject of enquiry which does not seem to have had the attention which it deserves. The most important of these is the so-called salt pan in the Pretoria district, where a flourishing little soda industry is being carried on. The available geological data regarding this deposit are, however, comparatively meagre. Hatch and Corstorphine, in their "Geology of South Africa," have discussed the subject, and pointed out that the pan may be the site of the eruptive centre of the whole igneous complex of the Bushveld. In the opinion of the same authors, "the presence of the deposit of carbonate and chloride of sodium to a depth of 200 feet (as shown in a borehole, which was not continued further), which is nearly 500 when reckoned from the top of the hollow, appears to strengthen the view that the pan is the result of volcanic action." The process from which the saline deposit originated is not made clear, but there is no reason to assume that volcanic action had any direct influence as a salt-producing agency. As a matter of fact, a fountain has long been known to exist in the immediate vicinity of a felsite area in the Pretoria district, if not actually in the felsite itself, from which a strong soda brine is obtained. There is no evidence of any volcanic action in the neighbourhood, and the water appears to have derived its constituents as a result of passing through rocks which yield these compounds by solution. An analysis of the water made several years ago is said to have shown a number of interesting components, and altogether to have proved that the fountain has some economic value. It is not unlikely that some process similar to that which is to be seen in progress at this fountain has been responsible, originally, for the vast deposit of soda and salt which is now being treated at the salt pan. At any rate, the possible connection between the two seems a matter of more importance than the purely geological interest to which it may give rise.

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Geduld.

The financial results of the Geduld for the past nine months by quarters compare as follows:—

Quarter.	Tons milled.	Mine profit.	Sundry revenue.	Total profit.
March	71,330	£32,251	£3,020	£35,271
June	74,760	33,576	3,230	36,806
September	77,950	36,620	3,490	40,110
September, 1914 ...	66,695	25,535	2,805	28,340

By setting out the figures of twelve months ago the position is seen to be very much better. Mine development redemption is now charged at 2s. 9d. per ton milled, as again 3s. 3d. in the September quarter, 1914. The improved results are attributable not to a higher grade of ore treated, but to a lowering of working costs. In the last quarter these averaged 20s. 8d.; twelve months ago they approximated 25s. 4d. Such an economy allows of the inclusion in ore reserves of rock 1 dwt. below what was previously regarded as profitable. Developments during the same period have shown good results:—

Quarter.	Ft. sampled.	Assay value. dwt.	Over in.	Dwt. in.
March	1,545	7	37·4	262
June	1,795	8·8	39·6	348
September	2,428	7	38·2	267

It will be seen that the amount of development work done has considerably increased during recent months.

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Welgedacht Exploration.

The report of the Welgedacht Exploration Company, Ltd., for the year ended 30th June states that development of the colliery has been continued. In July last, in order to prove the extension of the coal-bearing area in the south and south-east directions, it was decided to sink five additional boreholes. This work has now been completed and discloses three coal seams and of these only the lowest is for the time being taken into account. The seam extends over 125 acres and is estimated to yield 1,000,000 tons of marketable coal (including duff) of a little higher calorific value than the present mine standard. The coal sales amounted to 130,188 tons and realised (with sundry items of revenue incidental to this section) £33,084, or 5s. 0·98d. per ton, as against 5s. 7¾d. in the previous year. After deducting the cost of working and handling, amounting to £29,524, or 4s. 6·42d. per ton, as against 4s. 6¼d., a working profit is shown of £3,559, or 6·56d. per ton, as against 1s. 1½d. Included in these sales are 13,760 tons of duff, this class of coal having hitherto been dumped on the waste heap. The average monthly output for the year was 10,849 tons, as against 9,946 tons. The average monthly output for the four months ended 31st October, 1915, shows a further improvement at 11,243 tons. Water sales to the Rand Water Board amounted to 54,415,000 gallons. The net result of the year's working is a profit of £3,812, making, with the credit of appropriation account. The directors recommend balance brought forward, a total of £8,016 to the a dividend of 6d. per share, less income tax, leaving £4,489 to be carried forward. The cash and loans at 30th June, 1915, amounted to £42,166 and are earning a satisfactory rate of interest.

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Trading with the Enemy.

The Public Trustee, as custodian for England and Wales of enemy property, has issued a special notice to the Press drawing the attention of bankers, traders and others to important provisions of the new Act as follows:—(1) Dividends and interest payable in respect of all classes of securities held for enemies are now payable to the custodian. Under the provisions of the new Act interest on securities issued by, or on behalf of British, Colonial or Foreign Governments, or Corporations, or municipal or other authorities, and moneys representing the payment off of the capital of any securities are payable to the custodian. The duty of making such payments to the custodian, and of furnishing him with the necessary particulars, rests with the person, firm or company through whom the payments in the United Kingdom are made. Accountable parties should apply to the Public Trustee for Receivable Order " A " upon which the return should be made. No money should accompany the receivable order, but a warrant directing payment will be issued in due course. N.B.—Where coupons or drawn bonds to bearer are held for the accounts of enemy persons the holder should apply to the office of the Parliamentary Counsel, Whitehall, S.W., for a licence authorising the presentation for payment of such instruments, and should apply to the Public Trustee for copies of Receivable Order " A," which should be completed and handed to the paying authority, upon whom the duty will then fall to account to the custodian. (2) The obligation to register property with the Public Trustee under Sec. 3 (1) of the earlier Act is now extended to (*a*) bank balances and deposits; (*b*) debts to the amount of £50 and upwards. All persons, firms or companies with whom enemies have bank balances or deposits or who owe £50 or more to enemies (apart from those dividends, etc., payable to the custodian) should apply to the Public Trustee for Registration Order " F." N.B.—The Act provides that the liability to disclose property of any nature held for enemies shall apply to companies as well as to persons and firms. Companies who have not already disclosed property under Sec. 3 (1) of the old Act should therefore apply, to the Public Trustee for Registration Order " B." The term " enemy " means any person or body of persons of whatever nationality resident or carrying on business in the enemy country, but does not include persons of enemy nationality who are neither resident nor carrying on business in the enemy country. Attention is called to the penalties fixed by the Trading with the Enemy Amendment Act, 1914, for non-compliance with the requirements thereof, and to the fact that such penalties will also apply for non-compliance with the requirements of the present Act.

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Market Changes.

In its customary review, the *Bankers' Magazine* says that the Stock Markets during the past month have shown rather more activity, an outstanding feature being the buoyancy of American railroad securities. On balance the list of 387 representative securities taken by our contemporary exhibits an advance of nearly £20,000,000 to a total of £2,906,032,000. The special list of American shares shows a rise of nearly £20,000,000, or something like 5½ per cent., while the bonds have also advanced. Needless to say, Canadian railways have shared in the advance, both Canadian Pacific and Grand Trunk stocks having considerably improved. Gilt-edged securities have also been in greater favour and the War loans have shown a better tendency as the time has approached for the final date for converting Consols. On the other hand, the Home Railway market has been dull throughout the month, and it is pointed out that this is the more noteworthy because the half-yearly interest is beginning to accumulate on values. The reason for the depression, however, is to be found in the further threatened difficulties with regard to labour and in the conference which has taken place during the month by which further bonuses in the way of wages have been given to the men. The industrial group generally has been rather quiet on fears as to the effect likely to be produced by the excess profits tax.

TOPICS OF THE WEEK.

THE MINING INDUSTRY.

The consistent progress made by the gold mining industry of the Rand during a time of prolonged difficulty and anxiety has again been emphasised by the gratifying and inspiring speech which was delivered by Mr. W. H. Dawe on Monday last at the quarterly meeting of the Chamber of Mines. As Chairman, he had the duty of giving an account of the Chamber's stewardship during another period of supervision and responsibility, and the task of reviewing the operations of the many units which have combined to maintain the golden resources of an Empire at war. With an intimate knowledge of the essential factors of the mining position, it is not to be wondered at that Mr. Dawe was able to replenish that store of confidence in the soundness of the Rand which has been a source of solid comfort not only to those who live within the Union of South Africa, but has assuredly helped to encourage those in Europe who are deeply concerned with much vaster problems of finance. The speech from the chair covered much wider ground than the matter of a gold supply, however. It dealt with those questions of individual welfare in the mines which are recognised by the Chamber to be not less important or worthy of consideration than the need of production. That the address might be well rounded off as a message of comfort, particularly at this time of the year, it was necessary that the ever present labour problem should present no difficult aspect, and herein, as in other matters, Mr. Dawe was able to reassure us. A welcome announcement was that which was made regarding the thoroughness of the holiday leave arrangements that have been decided upon by the mining groups, and the further assurance that other facilities are being thought of and discussed in order that the whole scheme of healthful relaxation may have the solid effect that is desired both by employer and employee. Turning to the details of the speech we find that for the three months under review, gold valued at £10,005,079 has been produced in the Transvaal, as compared with £9,140,061 in the corresponding period of the previous year, an increase or nearly 10 per cent. The industry for the first time in its history is steadily producing gold at the rate of £40,000,000 sterling per annum, and the fact that this position has been attained at the period when the maximum supply of gold is of the greatest possible national value must, as Mr. Dawe remarked, be a matter of general satisfaction. Comparing the two periods, the working costs have increased by 7d. per ton, indicating that the considerable increase in the price of mining supplies has had its natural economic effect. In this respect, nevertheless, some saving has been made, for instance in the use of high explosives, a reduction of 60 tons per month bringing the consumption down to about 500 tons per month already, with the prospect of an additional saving of about 20 tons per month in the near future. An urgent matter is that of dust sampling, and it is satisfactory to learn that the Chamber's Standing Committee on Dust Sampling has recommended the sampling of every mine on the reef at least once in two months, instead of five, and that the present method in vogue on the mines be made more systematic by being done in conjunction with samplers employed by the Chamber. Some misunderstanding appears to have arisen with regard to the action of the Robinson Group in deciding to discontinue its contribution towards the cost of the undertaking, but a letter from the Secretary of the Group, which has since appeared in the Press, has made it clear that the work of dust abatement will not be diminished in any way by them as a result of this decision. The admirable spirit shown by the employees of the mining companies in the matter of service to the Empire and the Union, and the whole-hearted efforts of the groups to encourage this attitude, with all due consideration for the assistance which might be given to Great Britain and her Allies in other equally needed directions, were effectively proved by the statement that up to the 10th December no less than 13 per cent. of the white labour force on the mines were on active service with the consent of their employers.

SOUTH AFRICAN AND AUSTRALIAN INDUSTRIES.

Several months ago Mr. E. J. Way, as President of the South African Institution of Engineers, submitted for the consideration of the Government and the public the manner in which various possible sources of local industry might be turned to good account. An Australian Inter-State Commission has also been inquiring into the possibility of establishing new industries within the Commonwealth, and a report upon the subject was presented lately to the Federal Parliament. A distinction is made between new industries and the expansion of undertakings already being carried on, into new branches of production. Whether the potentialities of a protective tariff as a means of fostering unacclimatized trades for private advantage were not sufficiently perceived by the more enterprising inhabitants of the Commonwealth, or whether, as appeared to be more likely, the list of industries which had not already been attempted was an inconsiderable one, few opportunities for the introduction of new productive schemes were brought to the notice of the Commission. On the other hand existing industries were believed to offer abundant scope for expansion. The various aspects of the larger problem are, nevertheless, fully dealt with in the report, with due reference to the several economic elements which have to be considered in their mutual relationship, and not merely from the point of view of tariff adjustment. The Commission holds that the Commonwealth may reasonably look forward to supplying its own requirements in such directions as rails, iron and steel wire, sheet, rod, angle and constructional iron and steel, and innumerable articles of the like description not at present manufactured in the country. In view of the existence of a large local demand attention is directed to the following branches of activity which seem to offer opportunities to those who are willing to take them, and they are quoted by us as a useful and suggestive parallel line of discussion with that laid down by Mr. Way in the circumstances referred to at the beginning of this article: "Copper, wire, rod, tubes, and sheet from the copper. Tops, yarn, and the weaving of woollen fabrics from our own raw material. The saving and utilisation of the immense quantities of fats and oils, the by-products of wool-scouring, at present run to waste. Improvement of the process of tanning and preparation of leathers, so that their reputation may command a demand in foreign markets in preference to the hides from which they are made. Investigation as to the possibility of obtaining tanning extracts of commercial value from barks other than wattle. The prospect of the profitable production of alkalis from the natural salt deposits of South Western Australia. The economic production of wood pulp from the fibre of the forest trees of Australia, or from other material which may be successfully cultivated there for the purpose. The production of alum and potash from the local deposits of alunite, one of which, in the country of Gloucester, New South Wales, is said to be 'one of the most remarkable in the world.' In 1912 they exported 3,425 tons of alunite, valued at £13,700. Alum is used in dyeing as a mordant, in the manufacture of white leather, for sizing paper, to harden plaster of paris, in medicine, etc. The systematic exploration of promising localities in Australia, with the view of the possible discovery of natural petroleum deposits. The manufacture of tinplate from their own raw material. The possible utilisation of cheap water power for the purpose of manufacturing calcium carbide. The local cultivation of the better qualities of tobacco. The local manufacture of margarine, for which there is an immense market abroad. The growing of flax for fibre and linseed. The manufacture of zinc oxide. The cheapening of the cost of sugar for manufacturing purposes." Some of these suggestions, it will be observed, are in line with those made by Mr. Way, others are not unsuited to what may be broadly termed local conditions, while one or two are of distinctly doubtful value. As showing the practical interest in the subject, which is being taken at this time in a sister Commonwealth they may, however, serve as a stimulus and encouragement to local effort.

COAL ECONOMY.

The importance of being economical in the mining of coal does not appear to have been seriously considered as yet in this country. The question of economy in generating power is, however, a different matter, and with the facilities for obtaining cheap coal for that particular purpose it seems to be a subject that might well occupy the attention of those who have large deposits of practically unsaleable coal. Every possible economy in getting coal has now to be considered, said Mr. M. H. Mills at a recent meeting of the Institution of Mining Engineers in England, and the question whether the introduction of gas producers will reduce the cost of generating power deserves serious attention. At the same time, the use of unsaleable fuel is an all-important matter not to be overlooked. The history of the introduction of the gas producer shows how slowly some useful inventions have been adopted. With the introduction of the pressure producer, using bituminous coals, and with the various uses to which the gas came to be put, complicated methods of cooling, scrubbing, and washing the gas became necessary, and much ingenuity was exercised in designing various methods for getting rid of the tar in the gas and in making the gas suitable for use in large gas engines. And now, in the year 1915, the mining engineer can find a producer plant capable of dealing with almost any class of fuel containing upwards of 50 per cent. of ash, which, under ordinary conditions of combustion, would cake and form hard clinker—in fact, fuel utterly valueless for any other purpose can now be gasified successfully. Not only economy in the use of coal but the scientific utilization of coal is another matter that might well have consideration in this country, where there is so much of the mineral that cannot be sold to the mines and cannot easily be foisted upon the ordinary consumer. A start in this direction has already been made in Natal, but the chemical side of the coal industry is obviously one that is capable of useful and profitable expansion. For instance, taking the average British product, each ton of dry coal carbonised yields from 20 to 35 lbs. of ammonium sulphate, from 56 to 112 lbs. of tar, and from 2 to 3½ gallons of crude benzol, etc.—according to the locality. About 65 to 70 per cent. of the crude benzol is obtained as finished products—benzene, toluene, solvent and heavy naphthas. While the oil shale possibilities of the Union are being tentatively investigated by British interests the potential value of the inferior qualities of South African coal have been generally overlooked, except in the one instance above referred to.

S.A. Imports of Iron and Steel.

The following are the figures of imports of iron and steel and machinery into the Union of South Africa during 1914:—

	1913. £	1914. £
Pig-iron and ingots	7,701	4,268
Steel and iron castings	32,714	35,599
Girders, columns, etc.	73,324	61,271
Sheet iron and steel	78,256	57,059
Galvanised sheet iron	101,044	58,180
Corrugated galvanised iron	412,073	265,182
Hoop iron	21,188	10,426
Piping and fittings	391,068	320,523
Angle and sectional iron and steel	33.573	19,567
Bar iron, etc.	259,726	198,250
Anchors, haulage and other chains	19,317	16,818
Wire rope	119,354	103,664
Axles, etc., for carriages	60,526	43,033
Bolts, nuts and rivets	69,255	55.954
Nails and screws	71,653	55,893
Fencing wire	319,548	214,283
Fencing standards	203,125	93,915
Railway rails	79,271	78,249
Railway sleepers	6,656	30,206
Railway locomotives	60,148	12,882
Railway rolling stock	59,155	33,542
Other railway material	35,912	24,081
Tramway rails	21,189	14,137
Tramway rolling stock	28,403	21,439
Electrical machinery	451,280	433,669
Manufacturing machinery	304,441	312,239
Mining machinery	829,615	757,750
Electric cables and wire	250,669	194.170
Electric fittings and posts	263,768	232,069

THE EAST RAND.—I.

An Opportune Contribution to Rand Geology—Local Obstacles to Reliable Mapping—The Blue Sky-Benoni Gap.

Owing to the increasing interest which is being taken in the exploration and development of the Far East Rand, the following extracts from a paper read some little time ago before the Geological Society of South Africa, by Dr. E. T. Mellor, with the object of throwing some light upon the Eastern stratigraphical problem, will prove of value to those concerned. The difficulty of obtaining ample data and of drawing reliable conclusions are sufficiently indicated in the opening paragraphs:—

> In previous papers some of the main features of the geology of the West and Central portions of the Witwatersrand have been dealt with. In the present essay the Eastern Rand will be treated on somewhat similar lines. The survey and mapping in detail of an area like the Witwatersrand by a single individual, while it ensures the application of a uniform standard in description, must necessarily require a considerable length of time, especially when the great economic importance of the goldfield and the vast accumulation of information derived from mining operations and innumerable boreholes is taken into consideration. Further, before a more or less intimate acquaintance had been made with the whole of the area it was scarcely possible to write a very full description of any particular portion, especially in such important respects as the comparison and correlation of various members of the Witwatersrand System, as developed in different portions of the Rand. On the other hand, in the course of the survey a good deal of information was obtained which it was possible to put into definite form and render available for use without waiting for the completion of the whole work. To do this has been the object of the various papers referred to, and the interest taken in the Eastern Rand at the present time seems to justify similar treatment of that area. It is anticipated that before long it will be possible to publish a connected account and a complete map of the whole Witwatersrand. It will therefore not be necessary in the present paper to do more than to indicate somewhat briefly some of the main points in East Rand geology which may be immediately useful to those interested in that particular area, more especially as some East Rand features have been touched upon in a recent paper. The extensive and comparatively shallow synclinal basin of the far East Rand, whose existence was demonstrated long ago by the work of Hatch and others, still remains largely undeveloped. To it, many look with a confidence which is largely justified by what we already definitely know of the area, for the maintenance for a very long time to come of the dominant position in the world's gold production held by the Witwatersrand. One sometimes hears references to the "decline of the Rand" as if that were an imminent event, but in view of the possibilities of such an area as the far East Rand, of the known resources of the Central and nearer East Rand, and of past experience as to the way in which, owing to the existence of bodies of ore of which no account had been taken in previous estimates, apparently moribund mines continue to flourish for years, thus to anticipate the decline of the Rand appears very much as if one should speak of the decline of a man in the thirties.

DIFFICULTY OF IDENTIFICATION.

The fact that the outcrops of the Witwatersrand system in that district usually appear only as scattered inliers proves a serious obstacle to correct mapping even to those who have acquired a very extensive knowledge of the physical character of the various strata:—

> The almost continuous outcrops of the Witwatersrand System which characterise the Western, Central and nearer Eastern portions of the Rand do not disappear suddenly under the cover of dolomite and Karroo rocks of the Far East. They are lost to view gradually under the broken fringe of these later slightly inclined or horizontal formations, and frequently reappear in a number of small and widely scattered inliers. The limited and scattered nature of these small inliers, which frequently occupy the floors of pans or are exposed for short distances along some of the shallow "vleis," renders the identification of the rocks exposed a matter of some difficulty, which can only be satisfactorily dealt with after an intimate acquaintance has been made with the more continuous exposures of the nearer portions of the Rand.

The main features of the Lower Witwatersrand system in the East Rand, which were illustrated in the map which was published recently in the *South African Mining Journal*, are described as follows:—

> To deal first with the Lower Witwatersrand System: the extensive exposures of the Central and nearer East Rand, mapped and described in former papers, can, in their lowest portions at least, be followed without serious interruption to the north of the township of Benoni, almost to the eastern boundary of the farm Kleinfontein. In this neighbourhood and to the east of it the Lower Witwatersrand rocks are extremely broken, and much patient and detailed mapping and comparison is necessary for the elucidation of the various blocks of country and the faults which exist between them. About the southern portion of the farm Witkoppie the Hospital Hill Quartzites are thrown into a well-marked faulted syncline, whose axis lies a little south of the southern boundary of that farm. The existence of this considerable syncline does not appear to have been previously noted, although its effects on the local geology are important, resulting, among other things, in the Hospital Hill Quartzites having an outcrop of a mile or more in width. To the north of the syncline of Hospital Hill Quartzites, just described, the Orange Grove Quartzites, accompanied by the Water Tower Slates, pass eastwards across Witkoppic, as was shown in the map accompanying a former paper, and can be clearly followed as far as the eastern boundary of the farm. Here these beds become obscured by *débris* and drift derived from the Coal-measures and Glacial Conglomerate, but about three-quarters of a mile to the east can again be seen both at the surface and in prospecting trenches. About this point the Orange Grove Quartzites abut practically at right angles against Hospital Hill Quartzites, which strike in a north-easterly direction, and which appear to form part of a very large block of country with a similar strike, occupying the greater portion of the farm Kleinfontein. Beyond this block to the eastward, and near the homestead to the north of the Van Ryn mine, the Orange Grove Quartzites again appear at the surface, and are underlain as usual by granite. The occurrence of this granite so close to the outcrop of the Main Reef Zone at the Van Ryn has, I believe, long been known, but, as far as I am aware, no explanation has been offered of its presence, nor have the quartzites above it been recognised as corresponding to those of Orange Grove. . . . . .
> At its eastern extremity the extensive and massive outcrop of Orange Grove Quartzites, alluded to above, is faulted abruptly against quartzites of the Government Reef Series, which strike practically at right angles to the Orange Grove Quartzites, towards the N.N.E., and are continued in that direction for about two miles across the farm Vlakfontein until lost under Coal-measures and other more superficial deposits. The Government Reef, though poorly represented, is distinctly recognisable over the greater portion of the outcrop. The fault which brings the Orange Grove Quartzites against those of the Government Reef Series agrees very closely in direction and character with one of the largest faults in the Van Ryn mine, and the many faults which affect the reef on that property are no doubt closely connected in origin with the still more disturbed conditions shown by the Lower Witwatersrand System immediately to the north. It is interesting to note that these very severe disturbances occur in the same line as a number of others which can be observed several miles still further north, beyond the limits of the area now under review, and which extend into the neighbourhood of Pretoria.

THE BLUE SKY EXTENSION PROBLEM.

The geology in the neighbourhood of Benoni, beginning near the Kleinfontein Company's dam, a couple of hundred yards or so north-west of Benoni station, and running along the railway towards Dunswart, is specially interesting in view of the much-debated question of the extension of the Blue Sky section in that direction:—

> To return now to the west, a fairly complete section of the Government Reef Series is to be seen along the valley of the spruit which runs north-westward from Benoni Township. The Government Reef, though thin, is characteristically developed and the Coronation horizon also recognisable. South-west of these Benoni exposures the quartzites of the Government Reef Series are exposed in two inliers, one occupying the floor of the large pan in the south-west angle of Kleinfontein, and one crossed by the Main Reef Road and by the southern boundary of the adjacent farm of Klipfontein. These two inliers are particularly interesting because they show very clearly that the outcrop of the Government Reef quartzites also tends to follow a very similar bend to that which carries the horizon of the Main Reef Zone southwards towards the Apex Mines in this locality. It is remarkable, but perhaps very natural, that such significant outcrops as those of the Government Reef quartzites just referred to appear to be persistently ignored by the supporters of a view that the sub-outcrop joining the Cason and Blue Sky to the Van Ryn mines passes almost directly across the intervening space instead of following the curve by the Apex usually and correctly ascribed to it. The idea just referred to was responsible for much fruitless boring and prospecting in former years, which has continued at intervals till the present day. In a similar way, when it has been sought to connect the reefs of the Rietfontein mines with those of the Van Ryn, the presence of extensive outcrops of thick series of quartzites which render such a connection almost inconceivable has been persistently lost sight of. In such a troubled area as that just described it is easy to select outcrops which appear to favour any particular theory, and if those which are antagonistic are ignored a strong case can apparently be made out. In the map here reproduced all the principal outcrops with their very varied strikes are shown. Viewed as a whole, it will be seen that, though very broken in character, the structure of this piece of country is fairly clear, and that, while there are many wide divergencies in strike, the general structure is as consistent as is usually found under similar conditions,

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Karroo Coal Prospects.

To the Editor, *South African Mining Journal.*

Sir,—The statements of E. J. Dunn, with reference to the existence of coal in the neighbourhood of Dwyka conglomerate at Vereeniging and other places north of the Karroo, which are quoted by Mr. A. L. Chambers in your last issue, were made a good many years ago, and since then a great deal of additional information has been obtained bearing upon the question of the horizon of the coal measures in the Karroo sequence. Mellor, for instance, of the Geological Survey of the Union, has had occasion to investigate the matter fairly extensively, and with regard to the association of coal with Dwyka conglomerate at Vereeniging, he says in a contribution to the transaction of the Geological Survey of South Africa, read on August 20, 1906:—"The fact, therefore, that at Vereeniging the coal seams lie directly upon the glacial conglomerate by no means proves that a considerable lapse of time did not intervene between the laying down of these two deposits, and the existence of conglomerates above the coal, composed of materials similar to that of the glacial conglomerate, does not necessarily imply an inter-glacial origin for the coal seams." He concludes as follows:—"A summary of the evidence bearing upon the question of the correlation of the Transvaal coal measures shows, therefore, that the important question of the position of this series in the general Karroo sequence in South Africa cannot be said to be definitely settled. Up to the present time, however, the evidence available appears to be strongly in favour of a correlation of the coal measures of the Transvaal with the Beaufort, rather than with the Ecca horizon." The evidence in the same direction that is afforded by the Vryheid district is, I think, even stronger. Schwarz says "there is no correlation between the Transvaal coal beds and the carbonaceous shales above the Dwyka conglomerate in the Cape Colony"; and after explaining that the Dwyka shales exposed on the flanks of the mountains in the southern districts are beds which were originally deposited in the deeper central portion of the Karroo lake, he adds:—"This disposes of the theory that the carbonaceous beds of the upper Dwyka shales may, in the deeper portions of the Karroo, become actually coal-bearing, etc." (vide "South African Geology," ed., 1912.) It appears, then, that the question whether "coal seams of workable character occur at the horizon of the Ecca beds," is not most fully answered in the affirmative, as Dunn claims. The reports and opinion of the analysts to whom samples of Mr. Chamber's "coal" have been submitted, are certainly interesting. I should not think of questioning the results of their analyses but when they go beyond this and make a pronouncement upon a point which cannot, I think, be decided merely by an analysis, I do not feel able to follow them. The importance, from an economic and industrial standpoint, of the discovery which has been described by Mr. Chambers, cannot be doubted, and I quite agree with him that expenditure upon its development is justified in order to determine the resources of the fissures. My argument was to the effect that the plan of exploratory work which would be followed would very much depend upon the view taken of the probable origin of the carbonaceous material. It seems desirable, therefore, that some decisive opinion should be obtained with respect to the nature of the material in question, before elaborate arrangements are made to prove the existence of a deep-seated seam of coal which may be, as Schwarz observes, hypothetical. I regret that I have not in my possession at present any of the evidence or records of the operations to which I referred in my letter. If they are of sufficient interest to him, I have no doubt that Mr. George Beet, of Kimberley, would be able to put him in the way of getting them. I believe I am correct in saying, however, that the occurrence of the "coal" in fissures was a circumstance that made the cost of mining and exploratory work altogether prohibitive. The conditions may not necessarily be the same in the area described by Mr. Chambers, owing to hte large dimensions of the fissures, but the apparent similarity of the occurrences from a general geological and structural standpoint is one that cannot altogether be disregarded.—I am, etc.,

J. E. MILLS DAVIES.

Dormant Mines of the East Rand.

To the Editor, *South African Mining Journal.*

Sir,—There is no need for me to apologise for returning to the subject of the resuscitation of dormant mines in the Far East Rand, in view of the vast and successful developments that are being pursued, thereby enormously increasing the possibilities of those companies' properties which have been closed down for many years for want of capital to bring them to the producing stage. I mentioned previously that we can only look for expansion of industry by the restarting of new and old mines, and an opportunity now offers of adding several Bonanzas by the opening up of such blocks as the Cloverfield, Rand Klip, and Daggafontein; not forgetting the areas reserved by Government for eventual flotation. In the case of the Daggafontein, it is gratifying to be told that a large cash capital has been recently raised for this purpose, and I think it is a grand tribute of the confidence evinced in the Far East Rand zone, more especially too in such times as we are passing through. The company in question, which, by the way, adjoins the Springs Mines, is to be congratulated in setting the ball rolling, and I am sure from my intimate knowledge of the magnificent prospects of their claim holdings, that in due course they will receive their reward, which no one with the wefare of the future of the Rand at heart will grudge. Coming to the 'Rand Klip,' I can only reiterate that it will hearten old stagers when this concern is on its legs again. It is not generally known that the property is only divided from the Modder B by a strip of ground belonging to the State, which is an outstanding feature, as in the extreme workings of the Modder B property the developments are such as to warrant the belief that their rich reefs must eventually be traced to the Rand Klip, apart from those that this company have already exposed. In close proximity to the "Klip" lies the Cloverfield property, which should be one of the first to "re-waken." Its reefs still require developing, but I am certain of its eventual success, possessing as it does all the characteristics of its rich neighbours. The house controlling "Clovers" is Neumanns, and in view of the many disappointments this firm has suffered, I feel sure that they will make a great effort to bring this mine—one of their best holdings—to a successful issue. The public do not realise that the Far East Rand is going to add twenty or even more years to the life of the Rand—a factor which is indeed edifying in times of distress and turmoil.—I am, etc.,

E. L. E.

Benoni, December 20.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

TRANSVAAL GOLD MINE DIVIDENDS.

Preliminary List of Declarations for Half-year to December 31, 1915, made up to the time of going to Press.

The following is a list of dividends for the half-year ended December 31, 1915, declared by gold mining companies in the Transvaal up to the time of going to press. The complete list of mining dividends will, as usual, be published in a succeeding issue:—

Company.	Date.	No. of Dividend.	Rate %	On Issued Capital £	Amount £	Total Rate % 1915.	Total Rate % 1914.
Brakpan Mines	June.	7	17½	750,000	131,250	40	30
	Dec.	8	22½	,,	168,750	—	—
City Deep	June.	6	13¾	1,250,000	171,875	33¾	23¾
	Dec.	7	20	,,	250,000	—	—
Consolidated Langlaagte	June.	4	12½	950,000	118,750	25	20
	Dec.	5	12½	,,	118,750	—	—
Consolidated Main Reef	June.	14	6¼	924,364	57,772	12½	11¼
	Dec.	15	6¼	,,	57,772	—	—
Crown Mines	June.	28	35	940,106	329,037	65	85
	Dec.	29	30	,,	282,032	—	—
Durban Roodepoort	May.	82	10	125,000	12,500	25	25
	Dec.	83	15	,,	18,750	—	—
Durban Roodepoort Deep	June.	11	3¾	440,000	16,500	7½	7½
	Dec.	12	3¾	,,	16,500	—	—
East Rand Proprietary	June.	20	6¼	2,445,897	152,869	11¼	17½
	Dec.	21	5	,,	122,295	—	—
Geldenhuis Deep	June.	31	10	585,753	58,575	20	18¾
	Dec.	32	10	,,	58,575	—	—
Geduld Proprietary	June.	2	5	970,000	48,500	10	5
	Dec.	3	5	,,	48,500	—	—
Ginsberg	June.	24	7½	210,000	15,750	15	17½
	Dec.	25	7½	,,	15,750	—	—
Glencairn Main Reef	Dec.	18	5	550,000	27,500	5	5
Knights Deep	June.	20	7½	743,526	55,764	15	10
	Dec.	21	7½	,,	55,764	—	—
Langlaagte Estate	June.	50	7½	886,500	66,488	15	10
	Dec.	51	7½	,,	66,488	—	—
May Consolidated	Dec.	32	5	288,750	14,437	5	—
Meyer and Charlton	June.	51	40	200,000	80,000	80	70
	Dec.	52	40	,,	80,000	—	—
Modderfontein B.	June.	6	32½	700,000	227,500	67½	55
	Dec.	7	35	,,	245,000	—	—
Modderfontein Deep Levels	June.	1	10	500,000	50,000	35	—
	Dec.	2	25	,,	125,000	—	—
New Goch	June.	6	5	550,000	27,500	10	—
	Dec.	7	5	,,	27,500	—	—
New Kleinfontein	June.	21	5	1,151,540	57,577	10	10
	Dec.	22	5	,,	57,577	—	—
New Modderfontein	June.	18	16¼	1,400,000	227,500	32½	30
	Dec.	19	16¼	,,	227,500	—	—
New Primrose	June.	44	10	325,000	32,500	17½	40
	Dec.	45	7½	,,	24,375	—	—
New Unified	June.	14	10	250,000	25,000	20	20
	Dec.	15	10	,,	25,000	—	—
Nourse Mines	June.	22	5	827,821	41,391	10	17½
	Dec.	23	5	,,	41,391	—	—
Robinson	June.	46	8	2,750,000	220,000	14	18*
	Dec.	47	6	,,	165,000	—	—
Rose Deep	June.	28	17½	700,000	122,500	32½	35
	Dec.	29	15	,,	105,000	—	—
Simmer and Jack	June.	26	5	3,000,000	150,000	10	10
	Dec.	27	5	,,	150,000	—	—
Van Ryn Estate	June.	23	22½	500,000	112,500	40	45
	Dec.	24	17½	,,	87,500	—	—
Van Ryn Deep	June.	4	10	1,196,892	179,534	32½	25
	Dec.	5	17½	,,	209,456	—	—
Village Deep	June.	14	10	1,060,671	106,067	21¼	21¼
	Dec.	15	11¼	,,	119,325	—	—
Witwatersrand	June.	22	25	469,625	117,406	50	50
	Dec.	23	25	,,	117,406	—	—
Witwatersrand Deep	June.	19	15	550,000	82,500	28¾	32½
	Dec.	20	13¾	,,	75,625	—	—
Sub Nigel	Dec.	6	2½	431,580	10,790	2½	5

*Plus 10 per cent. bonus.

POSITION AND PROSPECTS OF THE WITBANK COLLIERY.

Points from the Annual Report.

THE report of the directors of the Witbank Colliery for the year ended 31st August, 1915, to be submitted to the fifteenth ordinary general meeting of shareholders, to be held on Friday, the 28th January, 1916, shows that the output reached a total of 791,323 tons, being a decrease of 79,782 tons upon that of the preceding year. The balance brought forward from the previous year was £76,658 7s. 6d.; the profit realised during the year, £67,396 4s. 9d.; interest, rents and sundry revenue, £1,428 3s. 4d.; making a total of £145,482 15s. 7d.; less audit fees for previous year, £262 10s.; Government tax on profits for previous year, £3,691 7s.; income tax to 30th June, 1914, £1,841 15s. 6d.; capital expenditure for past year, £1,681 17s. 1d.; dividends Nos. 20 and 21, declared during the past year, £42,000; directors' extra remuneration, £1,500; tar contract settlement, £10,000; sundry items, £806 11s. 10d.; total, £61,784 1s. 5d.; leaving a balance to be carried forward of £83,698 14s. 2d. The following items of capital expenditure have been incurred during the past year:—Buildings, £742 0s. 5d.; machinery and plant, £2,271 9s.; reservoirs, surface works, etc., £94 18s. 10d.; Uitspan equipment, £2,376 16s. 5d.; total, £5,485 4s. 8d.; less received by sale of freehold stands in Witbank Township, £1,242; furniture, livestock, vehicles and harness written off, £184 11s. 2d.—£1,426 11s. 2d.; total, £4,058 13s. 6d. On the 28th February, 1915, the directors declared an interim dividend No. 20 of 1s. 6d. per share (7½ per cent.) for the first half-year, and on the 31st August, 1915, a dividend No. 21 of 2s. 6d. per share (12½ per cent.) for the second half-year, making 20 per cent. for the year. It will be observed from the notice to shareholders embodied in the report that a special general meeting of shareholders has been convened to follow immediately after the annual meeting on the 28th January, 1916, for the purpose of considering and if thought fit passing a resolution authorising the extension of the objects of the company. This special meeting has been convened, as the directors wish to enter into an arrangement with the company's township at Witbank for the supply of electric light, which can be done at a small capital cost and a profitable basis, but are advised that there is a doubt as to whether, from a strictly legal point of view, they have the necessary authority under the company's articles of association. In the event of such resolution being adopted it will be submitted for confirmation at a subsequent meeting called for the 19th February, 1916. The consulting engineer, Mr. D. Wilkinson, writes:—The output of coal during the past year was 791,323 tons, including 100,146 tons of duff, thus showing a decrease of 79,782 tons as compared with the previous year. This decrease was caused by the war in Europe affecting the oversea trade, and by the rebellion and South-West campaign seriously diminishing the supply of railway trucks. During the seven months from September to March inclusive, the output averaged 59,163 tons per month, while during the last five months of the financial year, from April to August inclusive, the output averaged 75,436 tons per month. The number of days during which both mines were producing was only 244·8 as compared with 274·9 for the previous year. The machinery and screening plant have been maintained in good order throughout the year. The results obtained by the new electrical coal cutter indicate a reduction in the cost of this portion of the mining operations and at the same time a decrease in the number of skilled natives required for under-cutting the coal. The seams of coal in both mines continue to show a good width and quality, and the development is well in advance of requirements.

The Manager writes:—I beg to submit my report on the work carried out on this mine for the year ending 31st August, 1915. Output.—I append, for your information, a detailed schedule of monthly dispatches for the year from both Witbank and Uitspan, which amounted to 791,323 tons, this figure including duff coal. Witbank.—Machinery and Plant.—The Screening Plant has been thoroughly well maintained, and has run satisfactorily. New work completed and in course of construction embraces the following: Erection of 100-ton Double Platform Weighbridge; erection of 700 K.V.A. Generator and Exciter Set. The natural extensions of haulages and additional pumping plant at both mines necessitated the installation of this larger unit. Two 20,000 gallon steel storage tanks. One 150 h.p. geared endless rope haulage. Mine.—The seam continues to open up well, and values have been satisfactorily maintained. No faulting or disturbances of any consequence have been met with during the past year. The workings generally are in a safe and satisfactory condition. Large reserve areas have been developed, which are ready at any time to meet an increased demand. All haulages have been kept well advanced, and a new transformer station has been constructed below ground, ample provision having been made for the supply of additional electric power for the future. Buildings.—No new buildings have been erected during the past year. Sundry minor improvements have been carried out to your existing quarters, all of which have been kept in a thorough state of repair. Uitspan.—Machinery and Plant.—The Plant has been maintained in thorough repair, and has run satisfactorily during the past year. It has not been necessary to carry out any alterations or additions, with the exception of the covering of the rotary screens. Mine.—Development continues to prove the thickness and quality of the deposit to be well maintained. At this section also a considerable reserve of coal has been created and is available should a sudden call be made for an increased output. An electrical coal cutter has been introduced in this mine. This cutter continues to do good work, and has fully justified the change made in the method of undercutting your seam.

South African Railways.

Statement showing for the month of November the approximate tonnage and percentage of tonnage of commercial seaborne traffic from the different ports to stations within the competitive zone, *i.e.* Vereeniging-Pretoria, Springs-Klerksdorp, inclusive and including the South Rand and Vereeniging-Canada Junction lines:—

	TONNAGE.			TONNAGE.		
	Cape Ports.	Port Natal.	Lourenco Marques.	Cape Ports.	Port Natal.	Lourenco Marques.
Group 1—						
Rate 1 Rate 2 Rate 3	3,730	11,683	6,451	17·06	53·44	29·50
Group 2—						
Rate 4 Rate 5 Rate 6	2,301	4,879	3,565	21·42	45·41	33·17
Total	6,031	16,562	10,616	18·49	50·79	30·72

Laboratory Tests for Flotation.

Laboratory test for flotation are conveniently made in separatory funnels to be found in practically every chemical laboratory. The procedure recommended is to mix 100 grams of the minus-200-mesh sample with four times its weight of water and the amount of oil determined upon, the whole shaken violently and, allowed to settle for a few minutes, and the pulp drawn off through the cock into another similar funnel for another flotation treatment. With glass funnels the separation between froth concentrate and pulp may be made sharply. The kind and quantity of oil, the acidity or alkalinity of the water, proportion of water to ore, temperature, fineness of pulp, etc., may be varied at will until the best conditions are obtained. In this way valuable information may be obtained on a large number of samples before undertaking trial on a larger scale involving greater expenditure of time and materials. Experiments in flotation, says the *Mexican Mining Journal*, have shown that the proportion of water to ore may vary from 3½ to 1 to 7 to 1, with the best results on average ore between 4 to 1 and 6 to 1. When the pulp is sandy a low dilution is best, pure sand ground to 200 mesh requires a dilution of 1 to 1. Average slime, on the other hand, requires a high dilution of 8 to 1. Good extraction may be secured on either sand or slime if the proper dilution is secured in each case. In the experiments mentioned above pine-oils were the best flotation agents tested. For the best work in flotation it is necessary to have this oil present to the extent of 0·6 lb. per ton of ore. In actual plant practice where the water will be returned again and again to the top of the mill, the consumption of oil will be much less, probably not more than ¼ lb. per ton of ore. Pine-tar oil is much cheaper. It gives good extraction, but the grade of the concentrates is low. Cyanide treatment of flotation concentrates has thus far not proved successful. Whether this is due to the presence of the oil or not has not yet been definitely decided. Flotation tailings, on the other hand, are commonly cyanided readily, with a higher extraction and less consumption of cyanide than the original ore. This seems to be due to the fact that flotation removes both the minerals that are refractory to cyaniding and also the minerals that cause a high consumption of the chemical.

"GOLD FIELDS" ANNUAL REVIEW OF RAND MINING.—II.

Report by Manager and Superintending Engineer on Industrial Conditions and the Position of Subsidiaries—Effect of War on the Industry—Native Labour Prospects—The Campaign Against Miners' Phthisis.

The following is the concluding portion of Mr. D. Christopherson's annual report:—

Bewaarplaatsen.—This matter remains in the same position as stated in last year's report. Nothing can be done until some time after the General Election for the Union Parliament in October next. It is, however, hoped that the new Parliament will, without undue delay, re-introduce the Bill providing for one-half of the proceeds paid to the freehold owners concerned.

Water.—The Vaal River Scheme (referred to in last year's report) which is to provide a permanent water supply for the Witwatersrand, is still hung up, as, owing to the war and its effect upon the money market, it has not been possible to proceed with the raising of the required capital. During the three seasons of drought immediately preceding the last rainy season, considerable individual effort was made on the Rand to increase the water supplies of the various mines by means of additional dams and enlarged catchment areas. As the result of these supplementary schemes it is now possible during the rainy seasons to collect and conserve much greater reserves of water for mine purposes than formerly. In view of the work in connection with the Vaal River scheme being delayed for the reasons mentioned above, the steps taken by the mines have been of exceptional value.

Employees on Active Service.—As regards the men who have been called up on active service, either as British Reservists or members of the Defence Force, as well as those men who have volunteered for active service with the consent of their employers, arrangement were made for their positions on the mines being kept open for them, while in the case of those with dependents, half wages are being paid until further notice. The same facilities are also being extended to such employees who are given permission to volunteer with the South African Overseas Contingent. The Imperial Government authorised the Chamber of Mines to engage 200 mechanics for munitions production in Great Britain, and steps were taken to this end, the men's billets being kept open for them on the mines. There was a ready response to the invitation in this connection, and within a week or so 200 picked men left for England. It may be mentioned that, apart from the above, some highly skilled experts who held responsible positions on the mines have also been given leave, and are already at home, assisting the Imperial Government. While the mining companies have cheerfully and readily responded in these matters, it must not be overlooked that by so many good and experienced men having joined the forces, or gone home to assist the Imperial Government, the general efficiency on the mines must obviously be adversely affected, all of which adds to the working costs on a product with a fixed value.

Income Tax Act, 1915.—It is satisfactory to note that the 1915 Act exempts holders of mining debentures from the payment of income tax in respect of the interest upon such debentures.

Mining Taxation Amendment Act, 1915.—This provides for a special war levy of £500,000 upon the gold mines. The amount will be collected from the companies in proportion to the amounts assessed by way of Profits Tax under the Mining Taxation Act. Certain modifications are made to the principal Law, particularly the provision that capital expenditure of a company taken over by another company, which can be amortised, is limited by the "effective value" of the property taken over. Thus, in future, when a company may be taken over by another company, it will, to a great extent, not obtain the benefit of the recent judgment (Union Government v. Knights Deep, Limited) relating to the acquisition of the Simmer East property.

Far Eastern Rand.—In the mines on the Far Eastern Rand considerable areas of high grade ore have been opened up, and still continue to be encountered. This is a good augury for the future, and encourages the looking forward with confident hope to the further expansion of the Witwatersrand Gold Mining Industry as a whole. There yet remain to be dealt with in that district very large claim areas which are in the hands of the Government, and although at the end of the war there will be a big demand for fresh capital in other directions, there is no reason why this country should not be able to attract its share for the purpose of opening up these and other areas, provided that investors can feel assured of stable conditions.

As is customary, the following tables of statistics are appended, giving the results respectively obtained by the Transvaal Gold Mining Industry and by the mines of the Consolidated Gold Fields Group:—

TRANSVAAL.

	For the year ended 31st July, 1914.	For the year ended 31st July, 1915.
Total gold output, fine ozs.	8,332·171	8,741·128
Value of ditto at £4·24773, per fine oz.	£35,392,814	£37,129,951
Tons of ore milled (including tons treated by direct cyaniding)	25,767,998	28,182,571
Estimated mining profits from gold	£12,100,000	£12,200,000
Average number on Transvaal Gold Mines--		
Stamps dropping	9,782	9,847
Tube mills running	294	309
Tons of ore milled per stamp per day	8·519	8·969
Whites employed	22,285	22,172
Natives employed	173,261	190,127

NOTE.—With the exception of the estimated mining profits from gold, all the above figures are from official Government statistics.

CONSOLIDATED GOLD FIELDS GROUP.

Actual total gold output, fine ounces	745,192·587	806,264·512
*Value of output as shown in Companies' books	£3,132,852	£3,379,870
†Value of output at £4·24773 per fine ounce	£3,165,377	£3,424,794
Tons ore milled	3,218,310	3,387,215
Mining profits from gold (excluding expenditure on machinery renewals and replacements	£889,611	£924,399
Total profits (including sundry revenue and revenue from accumulated slimes) ...	£949,519	£974,371
Average number of stamps dropping	1,064	1,050
Average number of tube mills running	38	37
Tons of ore milled per stamp per day	9·554	9·548
Average number of Whites employed	2,279	2,372
Average number of White learners and apprentices included in above	206	190
Average number of natives employed	14,398	17,439
Total amount paid in salaries and wages to all labourers (including payments to contractors)	£1,115,158	£1,230,816

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* These are the amounts shown in the Sub-Companies' Returns, and work out at about 84s. per fine oz., which is the value after allowing for cost of freight to Europe, Bank Exchanges on advances, and realisation charges.

† £4.24773 per fine oz. of gold is the fixed value upon which Government statistics are compiled.

Mr. C. P. Leslie, the superintending engineer, in the course of his annual report dealing with the operations of the Transvaal companies connected with the Consolidated Gold Fields of South Africa, Ltd., states, *inter alia* —

During the year under review the mines of this group milled a total of 3,387,215 tons of ore, which yielded gold to the value of £3,379,870, of which working expenditure absorbed £2,455,471, or 72·6 per cent., and £924,399, or 27·4 per cent., went to profit. During the preceding year 3,218,310 tons of ore realised £3,132,852, divided into working expenditure of £2,243,241 or 71·6 per cent., and profit of £889,611, or 28·4 per cent. It will be seen, therefore, that, notwithstanding abnormal conditions resulting from the war, an increased profit has been secured of £34,788, as compared with the previous year, which had the benefit of a profit of £42,301 from the Jupiter mine before it was closed down in the month of October, 1913. The average yield per ton of ore milled was increased by 5·853d. to 19s. 11·480d., and working costs by 6·696d. to 14s. 5·982d., so that the working profit per ton milled was reduced by 0·843d. Increased expenditure for shaft maintenance, support of mine workings, mine development (charged to working costs), and larger contributions to the Miners' Phthisis Insurance Fund, together with an average addition to white wages of 2d. per shift, amounted in all to £85,001, equal to 6·023d. per ton milled. Working costs do not include special expenditure on renewals to plant amounting to £17,212, which is about one-half of the amount spent in this direction during the previous year. The considerable rise in price of stores due to the war did not affect the position as much as might be anticipated, on account of the economy which was observed in the use of supplies and because of the working off of stocks on hand. The cost of stores represents normally about one-third of the total expenditure included in working costs, and it has to be noted that our mines have begun now to feel the weight of the purchase, at increased prices, of new supplies. The interruption in manufacturing operations caused a steady rise in prices, especially of metals such as steel and zinc. Local substitutes for certain imported products which have become deficient in quality or excessive in price have been successfully employed, as for instance local lead nitrate in place of imported lead acetate. It is hoped that more will be done towards developing the resources of South Africa to avoid as far as possible the importation of commodities, such as mining supplies, and so relase overseas labour, material and transport for the use of the Allies during the war, and that any work undertaken in this direction will be carried out with a view to making it permanent. The improved profit for the year is attributable largely to a progressive increase in the native labour supply since the latter part of last year through various causes, including the relase of natives from diamond mining, which was closed down shortly after the outbreak of war. The influx of native labourers to our mines demanded an increase in the employment of white men at a time when the war and the South African rebellion absorbed a large proportion of the able-bodied white men of this country, including a considerable number of skilled mine employees, and also when mine workers who were enemy subjects were withdrawn. The consequent changes in white employment and unavoidable absorption by the mining industry of an unusually large percentage of untrained men had an unfavourable influence on native discipline and efficiency, so that the full benefit of the increased native labour force was not procured. It was fortunate that the mines of the Rand were able to employ a large number of white men whose normal occupation was brought to a standstill on account of the war, and it is noteworthy that, notwithstanding their employment, there was an increase in average wages per white man employed on the mines of this group during the year. Two hundred picked mechanics were selected recently from the mines of the Rand and sent to England as munimunition workers. Because of the favourable native labour position it was decided to resume work in the Howard section of the Jupiter mine, which restarted production on the first day of this month (September). The mine will be worked in conjunction with the Simmer Deep so as to avoid expense of separate management. Since the outbreak of war three hundred and eighty (or 16·5 per cent.) of our mine employees went on active service, and many more were restrained from following their example for fear of diminishing the gold output. The men remaining at work relieved their feelings to some extent by subscribing most generously to the war funds, to which they contributed, through our head office alone, no less than £11,204 during the first year of the war, in addition to which our companies, as employers, paid £11,447 to maintain the dependants of the men referred to who went to fight. It was considered especially inadvisable to spare heads of departments for the fighting line, as much depended upon the exertions of these highly trained men who have been largely responsible for maintaining, under adverse circumstances, the rate of output of gold without interruption. The demand for gold by belligerent countries as material basis of credit emphasises the Imperial value of the Witwatersrand output, which continues at an undiminished rate because the control of the seas permits importation of mining supplies. Attention continues to be given to health conditions, particularly as applying to underground workers, and improvements have been effected in the programme of eliminating the dust which causes the disease known as miners' phthisis. In order to better underground ventilation in our deep level mines, the Rhodes shaft of the Simmer Deep is being sunk to the mine workings to help the ventilation system of the Simmer Deep and Jupiter mines, and negotiations are in progress to provide facilities for assisting ventilation in the Robinson Deep through the adjacent workings of the Robinson mine. Better accommodation is being provided gradually in change houses and living quarters, and a scheme is being considered for giving an annual holiday to underground workers. For some years past the mining groups have found it necessary to employ private agencies to help to stem the illicit gold and liquor traffic carried on along the Reef. There seems to be no abatement in the illicit liquor supply to natives, and the amount of crime through this traffic interferes with the efforts being made towards settling a respectable community throughout the Rand. The appointment of Messrs. A. W. Stockett and F. G. A. Roberts as independent experts to determine the relative complement of natives required for each mine of the Witwatersrand was an important step in the right direction. These gentlemen, who are experienced mine managers, have been engaged for the last ten months in making a detailed study of each mine's conditions as affecting coloured labour requirements. It is confidently expected that a more equitable allocation of natives will follow which will have a decidedly beneficial effect in using the available labour supply to best advantage and in promoting and balancing the prosperity of the mining industry.

(*To be continued.*)

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As the steam ranges play an important part in the station, a short description of same will not be out of place before an electrical institute. In the lay-out of the steam pipe system there were four main principles kept in view, namely: (1) The piping should have a fall the whole length in the same direction as the flow of steam towards the main separators, so that the steam would carry any water which could collect forward into the separators. (2) That the expansion and contraction due to temperature changes could be controlled and compensated or restricted. (3) That the piping between boilers and turbines should be as short as possible. (4) That a rupture to any part of the system would not shut down any plant. The above principles have been well adhered to. Reference to the drawings will show clearly the system adopted, and it will be noticed that any water which collects is driven by the steam into the separators, which are the lowest points in the range. This water is exhausted and sent into the hot wells through steam traps. The steam range proper consists of 12 inch lap welded steel pipes, expanded into cast steel flanges, the tee pieces and valves being cast steel, the smaller branches for auxiliaries being welded on by the oxy-acetylen process. The whole range over the boiler rows is suspended by wrought iron rods and clamps from the steel construction, and is so flexible that it can be moved by one man. There are two anchors in each boiler house, which are tied to the main stanchions, and these are placed in the centre of each range, thus allowing of movement each way, towards the vertical compensator and towards the ring. The compensators consist of corrugated steel piping, which allows of a horizontal as well as a vertical movement, the vertical movements being taken up by a spring suspension fitting on the bend where the range turns down to the separators. All bends have a radius of four diameters, and the entire system is jointed with klingerite painted with graphite, and up to the present there has not been a joint leak. The whole system was subjected to a hydraulic pressure of 500 lbs. per square inch after being heated with steam, and only dropped 2 lbs. pressure after half an hour, principally through the valve glands. The other pipework consists of exhaust cooling and condenser ranges, which will be dealt with in connection with the auxiliaries. For purposes of description the auxiliaries will be split into two sections: Steam driven and electrically driven. The steam driven auxiliaries consist of circulating and air pumps, both being of the turbine type. The circulating pumps are of the vertical centrifugal type, capable of delivering 3,600 cubic meters of water per hour against a total head of 10 meters, or equivalent to 792,000 gallons and a head of 33 feet. These pumps are placed as before mentioned in the pump pits and are direct coupled by vertical shafting to the steam turbine on the condenser floor, and run at a speed of 1,050 r.p.m., and deliver into one common bus-pipe. The turbines are of the horizontal Curtis type, and are designed for superheated steam at 225 lbs. per square inch, having 14 nozzles, four permanently open, seven controlled by valves and three permanently closed. The air pumps are of the horizontal rotary type, direct coupled to the steam turbine, and have two impellers running in the one casing, which returns the condensed water to the hot wells and extracts the air, maintaining a vacuum of at least 95 per cent. The circulating and air-pump turbines exhaust into the main generator past an atmospheric valve connected to the main exhaust range, so that in the event of failure of the air pump or the main turbine tripping on the steam side, free exhaust to the atmosphere is ensured. The electrical auxiliaries consist of motor driven cooling pumps, drainage pumps, crane, air compressor, motor generators and fan, stoker and conveyor motors, already described, and all supplied with 3-phase current at 525 volts from the four station transformers, two 500 and two 1,000 k.v.a. oil immersed core type. The capacity of the above transformers was calculated on 2,375 h.p., made up as follows:—14 double fan motors, 75 h.p.=1,050 h.p.; 1 single fan motor, 75 h.p.=75 h.p.; 5 single fan motors, 125 h.p.=625 h.p.; 8 stoker motors, 20 h.p.=160 h.p.; 2 conveyor motors, 15 h.p.=30 h.p.; 1 compressor motor, 60 h.p.=60 h.p. intermittent load; 3 cooling pump motors, 12 h.p.=36 h.p.; 4 drainage fan motors, 3 h.p.=12 h.p.; 2 motor generators, 114 h.p.=228 h.p. intermittent load; crane motors=50 h.p.; lighting=50 h.p.; total, 2,376 h.p. The transformers are connected between the generators and the main step up transformers in tee to the 5,000 volt side of the main units, through direct-series trip oil switches, and are so arranged that by means of change-over links either of the 500 k.v.a. can be connected to either No. 1 or No. 2 12,500 sets, or the 1,000 k.v.a. transformers can be connected to either of the 18,000 sets. The above connections bring the station transformers within the protective system of the main units, and in order to reduce the current supplied by the generators on short circuit through a fault on these transformers they are connected through 5·8 per cent. reactances of the respective transformer capacity. The low tension side of the transformers are connected through automatic oil-break trip switches to the bus-bars of the main auxiliary board, which are split into sections through non-automatic oil switches. From this main auxiliary board four 3-core 400-amps. paper insulated cables run to the boiler house auxiliary board from which the fan, stoker and conveyor motors are fed by duplicate cables through air break switches and fuses. This main auxiliary board also feeds direct the two motor generators, three cooling pumps, four drainage pumps, compressor, crane, and lighting transformers. The four boiler house feeders and the two motor generator feeders are protected by direct acting three-phase circuit breakers, the remaining feeders being protected through three pole air break switches and fuses. The cooling pumps are direct coupled to 12 h.p. motors with short circuited rotors, and arranged for star delta starting. These pumps are of the Balcke centrifugal type, designed for an hourly output of 100 cubic meters against a 20 meter head, and supply all the water used for bearing and transforming cooling, as well as the make up and priming water. The drainage pumps are direct coupled to 2·7 h.p. motors, arranged for star delta starting. These pumps are of the Balcke two stage high pressure type, designed for an hourly output of 10 cubic meters, and are used for keeping the pump shafts dry, as well as returning the cooling water used on the pump and shaft bearings. The motor-generators are each for an output of 75 k.w. at 220 to 330 volts. The D.C. machines are fitted with commutating poles, the driving motors being of the induction type, and are 114 h.p. each, running at 980 r.p.m. The capacity of these motor-generators was based on the excitation of one generator=50 k.w., emergency lighting 5 k.w., and battery charging 20 k.w. The battery supplies all the current for the remote control switches, emergency steam valve motors and lighting, and although provision has been made for installing two which would normally be connected in parallel, only one has been provided, as under all but abnormal conditions of working, one battery would be capable of exciting one main generator for a period of at least two hours, when fully charged. The battery consists of 120 cells in double glass boxes, designed for 450 ampere-hours discharge, the maximum charging current being 225, and the normal 180 amps. The air compressor is driven by a 60 h.p. motor, through belting, and is used for soot-dusting the boiler tubes and blowing out motors, etc. The crane was built by Messrs. Babcock & Wilcox, and is of the 5-motor type, provided with main and auxiliary crabs, and has been tested to 60 tons on site by lifting one of the A.E.G. step up 12,500 k.v.a. transformers. The main turbo generators at present installed are four A.E.G. turbo generators, two of 12,500 and two of 18,000 k.v.a. capacity, and as they are all of the same type, a description of one of the 18,000 sets will suffice. The set is capable of a output of 18,000 k.v.a. or 12,000 k.w. at a power factor of 0·67, and generates 3-phase current at a pressure of 5,000 volts and 50 cycles, running at a speed of 1,000 r.p.m. The turbine is designed for a working pressure of 16 atmospheres, superheated to 350 degrees C., and consists of one high pressure stage comprised of three Curtis wheels and eleven Rateau or expansion stages. The high pressure steam enters the first ring of expanding nozzles, and then passes through the moving wheel buckets, which in the above case are arranged in three rings, separated by sets of fixed guides. After passing through this first stage the steam is further expanded in a second set of nozzles, and then passes through the eleven Rateau stages which are separated by fixed guide rings as in the high pressure cylinder. The steam supply to the turbine both at boiler pressure and auxiliary exhaust pressure is controlled by trip valves linked together and operated from the governor. After passing the trip valve the high pressure steam enters the nozzle box, which contains 14 nozzles, two of which are permanently open, the remaining 12 being controlled by hand regulators, which are opened or closed according to demand on the generator. The auxiliary exhaust joins the main steam in front of the second set of expansion nozzles, and after passing through the expansion stages enters the condenser. As the volume of steam is very much greater after the first expansion, the second expansion nozzles are more in number, and are provided around the whole of the second stage periphery. The rotor of the turbine is bolted direct to the rotor of the generator, and the two are carried on three bearings, which are lubricated under pressure, and also water jacketed for cooling. Both the high and low pressure ends of the turbine rotor are sealed by steam packed labyrinth glands. The turbine exhausts into a condenser of the marine contra flow type, so designed that a vacuum of at least 92 per cent. is maintained at full load, with the normal output of the circulating pump described above, at a temperature of 25 degrees C., or a 95 per cent. vacuum, with the same amount of water at 15 degrees C. The condenser consists of a rivetted wrought iron casing, with the necessary steam and water connections, and is provided with a water chamber on the front end, into which the inlet and outlet water pipes are connected, and has a total cooling surface of 1,950 square meters, or 20,800 square feet, and contains over 4,100 cooling tubes, each 23 feet 6 inches long, 13-16 in. interval, and $\frac{7}{8}$ in. external diameter, manufactured of brass with 70 per cent. copper, and fixed in a Muntz metal tube plate with bronze ferrules, so packed as to allow of expansion of the tubes; it is direct connected to the turbine exhaust through a water and air gauge. These condensers were despatched from the makers in four separate parts, owing to the S.A.R. authorities being unable to carry same if assembled; this necessitated the assembly and tubing on site, which work occupied two fitters with a gang of natives for three weeks. The generator is of the revolving field six pole type, designed for the above-mentioned output, the stator being bar wound, with two bars per slot connected in star. These bars are insulated with leatheroid and micanite to a thickness, and stiffened to be capable of withstanding a momentary short circuit at normal voltage, and an insulation pressure test of 12,500 volts for one minute between phases, and from each phase to earth. The shaft is of wrought steel carrying the rotor windings, which consist of flat copper strip for an exciting pressure of 220 volts; it also carries cast bronze ventilators which drive the air through the entire generator. These rotors were subjected to a test pressure of 1,000 volts for one minute between slip rings and shaft, the slip rings being steel pressed on over micanite bushings. The exciter is of the shunt wound type, designed for an output of 75 k.w. at 220 volts, and mounted on the end of the main shaft without an outside bearing, the field of same being bolted direct to the main outside bearing of the generator itself. The exciting current of the generator is 290 amps. at 220 volts, at a power factor of 0·67, or 180 amps at 220 volts at unity power factor, the generator in each case supplying 12,000 k.w. The automatic speed regulation of the set is so arranged that by a sudden increase or decrease in the load of 25 per cent. the speed does not alter 1·5 per cent., or by reducing the load from full to no load the speed does not increase by more than 5 per cent.; it is, however, provided with a governor which automatically trips the main steam valve should the speed increase through any cause above 10 per cent., and the increase in voltage is not more than 15 per cent. at 0·67 or 38 per cent. at unity under the above conditions. The writer, however, saw a very fine display on the lightning arresters last summer, when the load was dropped off at the supply end of the line, and the governor failing to act, the machine through its step up transformer ran up to what was calculated to be 150,000 volts, which flashed across phases and on to the iron hand rails on the arrester floor. There is a guaranteed steam consumption of the set when supplied with a pressure of 220 lbs. per square inch superheated to 650 degrees F. as follows:—

Output.		Condensing water temperature. 25°c.	15°c.
Full load	12,000 k.w. . .	14·3 lbs. per k.w. hour	13·4 lbs.
¾ load	9,000 k.w. ...	13·4 lbs. per k.w. hour	12·6 lbs.
½ load	6,000 k.w. . .	13·0 lbs. per k.w. hour	12·4 lbs.

The above consumption with a vacuum of 30 inches, and for purposes of correction the following values are given:—

+ or —	7°c. superheat	... — or	1%	steam consumption.
+	1% vacuum	... —	½%	steam consumption.
—	1% vacuum	... +	2%	steam consumption.

As before mentioned the generators are of the air cooled type, the air being drawn through filters by the bronze ventilators or impellers on the rotor. Each of these filters are designed to deal with 72,000 cubic meters of air per hour, and consist of six frames 2·0m. high by 1·74m. wide, carrying 162 fire-proofed cloth pockets each 1·25m. deep, the net and gross filter service amounting to 738 and 810 square meters respectively, which gives an air velocity of approximately 3 feet per second. These filters were made by Messrs. K. & T. Moller, of Brakwede, and are similar in construction, but larger than those erected at the other stations of the company. The whole of the switchgear is installed on the 80,000 volt. side of the station, and consists of two distinct types, namely, A.E.G. and Westinghouse. The A.E.G. type is installed for the control of both Nos. 1 and 2 generators, the Westinghouse controlling Nos. 3 and 4. From each of the A.E.G. type main generators five three-core paper insulated 210 square mm. cables are run in parallel direct through ducts to the 12,500 k.v.a. step up transformers. These transformers are of the 3-phase oil insulated, water cooled, core type, designed for an efficiency at unity power factor of 98·6 per cent. The primary or 5,000 volt side is connected in delta, the secondary being connected in star and arranged for either 42,000 or 84,000 volts. with 5 per cent. + or — tappings. On each phase 2½ per cent. of the total h.t. windings nearest the outgoing terminals are insulated to stand 25,000 volts. between turns for five minutes, the other test pressures applied after erection at Vereeniging were: Primary windings, 15,000 volts. for 15 minutes between windings and core. Secondary windings, 160,000 volts for 7½ minutes between windings and core, and 160,000 volts. between phases for 7½ minutes. The L.T. insulators were tested to 25,000, and the H.T. to 200,000 volts. For the purposes of above tests special cables were taken from No. 1 generator to one of the transformers which was connected up to give the required test pressure, and this in turn was connected to the H.T. terminals of the other. The current taken by the two transformers under test amounted to 8·800 k.v.a. This test found a loose insulator in the cover, and one of the leads connecting the two transformers burnt through after which the terminals flashed over, but was otherwise satisfactory. The maximum volts. across the transformers reached a pressure of 170,000 volts. without failure. From the H.T. terminals of these transformers 16mm. solid copper rods are taken through leading through insulators into the oil switch chambers where they pass through current transformers two switches in series, resistances and links on to the busbars. The current transformers are designed for a working pressure of 100,000 volts, and are of the oil immersed type with a ratio of 100 to 2·9, the secondary windings of which supply the current for the differential relays and ammeters. The 3-phase oil switches each consist of three single pole switches coupled together by means of square link chains operated from the control board by 220 volt. electro-magnets on both outside switches, the trip gear being connected on the centre phase. As before mentioned there are two switches in series on each phase, the first switch when closed connecting the transformer or line to or from the busbars through resistances, and the second switch, the closing of which is controlled by the first shorting the resistance. On the opening of a switch reverse conditions obtain; the second switch opening first and cutting in the resistance; the first switch opening the circuit through the resistance. There is a distinct interval of time apparent between the closing or opening of the first, and the closing or opening of the second which amounts to 7 cycles, and may be noticed in the swing of the voltmeter needles. Each single pole switch is provided with six breaks of 9 inches each, which give a total break under oil of 54 inches, and is designed and guaranteed to break 400 amps at 100,000 volts. The oil tanks are provided with lowering gear operated through worm gear by hand levers, and are wood lined all round. This gear is very necessary, as the tank and oil together amount to two tons, and the switches being erected on the first floor allows the tanks to be lowered to the ground. These switches were subjected to severe tests at the maker's works before being accepted, the tests being as follows:—(1) Each switch was tested in a finished condition until the insulators arced over and the pressure at the time of arcing was at least 200,000 volts. (2) Each switch was subjected to carrying 4,000 amps for 30 seconds without damage or burning of contacts. (3) They were closed on short circuit on the 12,500 k.v.a. generators, and are capable of opening a short circuit on a 100,000 k.w. station. The resistances are of the grid type assembled in frames which are carried on 100,000 volt. insulators. The links are of the double change over type erected on girders in the busbar room so arranged that either machine or line may be connected to either or both of the two busbars. The busbars consist of 1in. copper tubes ⅛in. thick carried on suspension insulators. There are five insulators between each phase and between phases and earth, the connections from the links to these bars are made by 16mm. solid copper. As these Westinghouse type switches control the 18,000 k.v.a. sets there are 8-3 core paper cables in parallel similar to those on 12,500 k.v.a. sets taken direct to the two 9,000 k.v.a. step up transformers which are connected in parallel on both high and low tension sides. These transformers with the exception of being shell type are generally similar to the A.E.G. 12,500 k.v.a. above described, and were subjected to similar tests at the maker's works. These switches differ from those of the A.E.G., being of the reactance type, with coils and current transformers wound on the arms of each switch and enclosed inside the oil tank. They are designed for remote control, and deal with 600 amps., and are fitted with main and auxiliary contacts, and although connected up two in series on each phase, they operate on the closing and opening simultaneously, the auxiliary contact taking the place of the second switch in the A.E.G. section, and cutting in the reactance. These switches are operated through levels actuated off the solenoid and running through the tops of the three single pole switches, to which are connected through mechanism the bridgings. They are fitted with condenser type insulators 7 feet long, and take 60 h.p. momentarily to close. These switches were designed to stand on a floor, but have been fitted on site with lowering gear similar to that provided with the A.E.G. type. The interval of time between the closing or opening of the auxiliary or main contacts is very much more marked on the reactance type than is the case with the resistances on the A.E.G. type (the reactance value is 30 ohms per phase) and can be noticed on the synchronizing volt meter. The interval amounts to 5 cycles. Nos. 1 and 2 line switches are of the A.E.G. types. Nos. 3 and 4 being of the Westinghouse type, and are controlled and tripped through overload time relays. The machine switches are tripped by either reverse current or differential relays which also bring down the exciting current on the generators. All the above relays are mounted on a separate board erected at the back of the main control board. The main control board comprises panels for four lines, four generators and exciters, two Tyrrel regulators, two motor generators and one battery, the synchronising instruments being carried on swinging brackets at either end. The lines are made alive from the Robinson compressor station end, the synchronizing and paralleling being carried out at Vereeniging. The output of the station is measured by energy meters connected to each of the four generators from which the units supplied to the auxiliaries and transformer losses are deducted. The lighting of the station is done by 1,000 c.p. Osram lamps in the turbine house and by 32 c.p. metallic lamps in the boiler and switch houses. The feeders to the lighting boards are controlled by d.p. change over switches arranged so that they can be fed from the lighting transformers on the A.C. side, or from the battery on the D.C. side in cases of emergency. The wiring is all carried out on the draw in system in screwed conduit, and was done by Messrs. W. Haine, Ltd.

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JOHANNESBURG.

TRADING WITH THE ENEMY: NEW BILL.

Important Provisions—Retrospective Effect—Companies and Shareholders.

A BILL to provide for the imposition of penalties for trading with the enemy, for the better control of the property and other assets of alien enemies in the Union, and for other purposes connected with assets and property of the enemy, will be introduced by the Minister of Finance when Parliament reassembles in February. We quote some of the more important clauses:—

1. (1) Any person who, during the present war, trades or has, since the fourth day of August, 1914, traded with the enemy, within the meaning of this Act, shall be guilty of an offence, and shall—

(a) On conviction before a Magistrate's Court, be liable to imprisonment with or without hard labour for a period not exceeding twelve months, or to a fine not exceeding five hundred pounds, or to both such imprisonment and fine; or

(b) On conviction before a superior court, be liable to imprisonment with hard labour for a period not exceeding seven years or a fine, or to both such imprisonment and fine.

And the court may, in either case, order that any goods or money, in respect of which the offence has been committed, shall be forfeited to the Crown. Upon the authority of any such order, any police officer of commissioned rank may enter upon any premises at any hour by day or by night and seize any goods or money the subject of the order.

(2) For the purposes of this Act a person shall be deemed to have traded with the enemy—

(a) If he has taken part in any transaction or performed any act which was at the time thereof prohibited by or under any proclamation of His Majesty published in the "Union Gazette" (whether the publication of such proclamation was before or after the commencement of this Act); or

(b) If he has attempted or directly or indirectly offered or proposed or agreed to take part in any such transaction or to perform such an act; or

(c) If without lawful authority (the proof whereof shall lie upon him) he has in any manner in the Union aided or abetted any other person outside the Union in entering into, negotiating or completing any transaction or in doing any act which if effected or done within the Union, would have constituted an offence of trading with the enemy; or

(d) If without lawful authority (the proof whereof shall lie upon him) he has dealt or attempted or offered, proposed or agreed, whether directly or indirectly, to deal with any money or security for money or other property or assets in his hands or over which he has any claim or control for the purpose of enabling an enemy to obtain money or property or assets or credit thereon; or

(e) If he has taken part in any transaction or performed any act which is accordance with the English or the Roman Dutch Common Law or by this Act or by any other law constitutes trading with the enemy: Provided than any transaction or act permitted by or under any proclamation referred to in this Act shall not be deemed to be trading with the enemy.

(3) Where a company has entered into a transaction or has done any act which is an offence under this section, every director, manager, secretary, or other officer of the company who is knowingly a party to the transaction or act shall also be deemed guilty of the offence, and whenever a firm or partnership has entered into such a transaction or done such an act every member of the firm or partnership who is knowingly a party to the transaction or act shall also be deemed guilty of the offence.

(4) A prosecution for an offence under this section shall not be instituted except by or with the consent of an Attorney-General after information or complaint lodged by the Treasury: Provided that the person charged with such an offence may be arrested and a warrant for his arrest may be issued and executed, and such person may be remanded in custody or on bail notwithstanding that the consent of an Attorney-General to the institution of the prosecution for the offence has not been obtained, but no further or other proceedings shall be taken until that consent has been obtained.

(5) Where a transaction or an act constitutes an offence both under this Act and under any other law, or both under this Act and at common law, the offender shall be liable to be prosecuted and punished under either this Act or such other law, or under this Act or at common law, but shall not be liable to be punished twice for the same offence.

POWER TO INSPECT BOOKS.

(1) Whenever the Treasury is satisfied that there is reasonable ground for suspecting that an offence under this Act has been or is about to be committed by any person, firm, partnership, or company, it may authorise any person to inspect all books or documents belonging to or under the control of that person, firm, partnership, or company of, and to require any person able to give any information with respect to the business or trade of that person, firm, partnership, or company to give that information, and also, if accompanied by a member of the police force, to enter and search any premises used in connection with the business or trade, and to seize any such books or documents as aforesaid: Provided that when it appears to the Treasury that the case is one of great emergency and that in the interests of the State immediate action is necessary, the Treasury may cause the powers of entry, search, inspection, and seizure conferred by this subsection to be exercised without a strict compliance with the provisions thereof.

(2) Where it appears to the Treasury—

(a) In the case of a firm or partnership, that one of the partners was immediately before or at any time since the commencement of the present war, a subject of, or resident or carrying on business in, a State for the time being at war with His Majesty;

(b) Or in the case of a company, that one-third or more of the issued share capital or of the directorate of the company immediately before, or at any time since, the commencement of the present war was held by or on behalf of or consisted of persons who were subjects of, or resident or carrying on business in, a State for the time being at war with His Majesty; or

(c) In the case of a person, firm, partnership, or company, that the person, firm, partnership or company was or is acting as agent for any person, firm or company resident or carrying on business in a State for the time being at war with His Majesty.

The Treasury may, if it think it expedient for the purpose of satisfying itself that the person, firm, partnership, or company is not trading with the enemy, give, by written order, to a person appointed by it, authority to inspect all books and documents belonging to or under the control of the person, firm, partnership, or company, and to require any person able to give information with respect to the business or trade of that person, firm, partnership, or company to give that information.

For the purpose of this sub-section, any person authorised in that behalf by the Treasury may inspect the register of members of a company at any time, and any shares in a company for which share warrants to bearer have been issued shall not be reckoned as part of the issued share capital of the company.

(3) If any person having the custody of any book or document which a person is authorised to inspect under this section refuses or wilfully neglects to produce it for inspection, or if any person who who is able to give information which may be required to be given under this section, refuses or wilfully neglects, when required, to give that information, that person shall, on conviction by a Magistrate's Court, be liable to imprisonment with or without hard labour for a period not exceeding six months, or to a fine not exceeding £50, or to both such imprisonment and fine.

(4) Where, on the report of an inspector appointed under this section to inspect the books and documents of a person, firm, partnership or company it appears to the Treasury that it is expedient that the business should be subject to frequent inspection or constant supervision, the Treasury may appoint that inspector or some other person to supervise the business, with such powers as the Treasury may determine, and any remuneration payable and expenses incurred, whether for the original inspection or the subsequent supervision to such amount as may be fixed by the Treasury, shall be paid by the said person, firm, partnership, or company.

(5) Where a person has given any information to a person appointed to inspect the books and documents of a person, firm, partnership, or company under this section, the information so given may be used in evidence against him in any proceedings relating to offences of trading with the enemy, notwithstanding that he only gave the information on being required to do so by the inspector, in pursuance of his powers under this section.

POWER TO APPOINT RECEIVER.

(3) Where it appears to the Treasury, in reference to the trade or business of any person, firm, partnership, or company:

(a) That an offence under this Act has been or is likely to be committed; or

(b) That the control or management of such trade or business has been or is likely to be so affected by the state of war as to prejudice its effective continuance, and that it is in the public interest that the trade or business should continue to be carried on; or

(c) That, for any other reason, it is expedient in the public interest—the Treasury may appoint a controller of such trade or business for such time and subject to such conditions as may be deemed necessary, and may charge the remuneration and all expenses connected with such appointment to such person, firm, partnership, or company.

PAYMENT OF MONEYS, ETC., PAYABLE TO ENEMY.

Any sum which, if a state of war had not existed, would have been payable and paid to or for the benefit of an enemy, by way of dividends, interest, share of profits, or on any other account whatsoever, shall be paid by the person, firm, partnership, or company by whom or by which it would have been payable, to the Treasury to hold subject to the provisions of this Act, and the payment shall be accompanied by such particulars at the Treasury may require.

ENEMY SHAREHOLDERS.

Every company, incorporated or registered in the Union and every company which, though not incorporated or registered in the Union, has therein a share transfer or share registration office shall, within one month after the commencement of this Act, by notice in writing communicate to the Treasury full particulars of all shares, stock, debentures, and debenture stock and other obligations of the company which are held by or for the benefit of an enemy; and every member of any firm or partnership one or more of whom, on the commencement of the war, became enemies or to whom money had been lent for the purpose of the business of the firm or partnership by a person who so became an enemy, shall, within one month after the commencement of this Act, by notice in writing communicate to the Treasury full particulars as to any share of profits and interest due to such enemies or enemy; and, if any company or member of a firm or partnership fails to comply with the provisions of this sub-section, the company shall, on conviction before a Magistrate's Court, be liable to a fine not exceeding £100, and, in addition, to a further fine not exceeding £50 for every day during which the default continues, and every director, manager, secretary, or officer of the company and every member of the firm or partnership who is knowingly a party to the default shall, on the like conviction, be liable to the like fine, or to imprisonment, with or without hard labour, for a period not exceeding six months, or to both imprisonment and fine.

POWER TO VEST ENEMY PROPERTY IN TREASURY.

A provincial or local division of the Supreme Court or a judge thereof may, on the application of any person who appears to the Court or judge to be a creditor of an enemy, or entitled to recover damages against an enemy, or to be interested in any property, movable or immovable (including any rights, whether vested or contingent, in or arising out of property movable or immovable), belonging to or held or managed for on behalf of an enemy, or on the application of the Treasury or any other Government department, by order vest in the Treasury any such property as aforesaid if the Court or the judge is satisfied that such vesting is expedient for the purposes of this Act, and may, by the order, confer on the Treasury such powers of selling, managing, and otherwise dealing with the property as to the Court or judge may seem proper.

The Court or judge before making any order under this section may direct that such notices (if any), whether by way of advertisement or otherwise, shall be given as the Court or judge may think fit.

HOLDING AND DEALING WITH PROPERTY BY TREASURY.

The Treasury shall, except so far as a provincial or local division of the Supreme Court or a judge thereof may otherwise direct, and subject to the provisions of the next succeeding sub-section, hold any money paid to and any property vested in it under this Act until the termination of the present war, and shall thereafter deal with the the same in such manner as the Governor-General may direct.

The property held by the Treasury under this Act shall not be liable to be attached or otherwise taken in execution, but the Treasury may, if so authorised by an order of a provincial or local division of the Supreme Court or a judge by whose order any property belonging to any enemy was vested in the Treasury under the Act, or of any court in which judgment has recovered against an enemy, pay out of the property paid to it in respect of that enemy the whole or any part of any debts due by that enemy and specified in the order.

Zinc Dust Requirements.

Zinc dust satisfactory for precipitation of precious metals from cyanide solutions should satisfy the following requirements: It should be fine; that is, most of it should pass through a 200-mesh screen, and the fine portion should be very much finer than the screen opening. As the surface exposed per unit weight varies inversely as the diameter of the particles, and the number of grains varies inversely as the cube of the diameter, if the average diameter or one lot of dust is one-half that of another, the finer would have twice the surface and eight times the number of particles. The dust would remain in suspension better, and, if uniformly distributed, the distance between grains would be half that of the coarser material. The oxide should be low, but very low oxide does not necessarily indicate a good zinc. There should be a reasonable amount of lead, over 1 per cent. As high as 4 per cent. may do no harm. Cadmium is usually present, and some cadmium may take the place of part of the lead. If oil is present, it should not be in such quantity as to prevent good mixing of the dust with the solution. Precipitation with a standard solution of silver cyanide gives a rapid method of approximating the value of a particular lot of zinc dust. If the efficiency is well over 40 per cent. (100 per cent. being the theory for complete replacement of pure zinc by silver), the zinc is satisfactory. If under 30 per cent., the dust will probably give poor results. The condition of the metallic impurities may have much influence. It is quite possible that the composition of different particles may vary according to the time in the distillation when they were condensed, or because of mixing of lots of dust of decidedly different composition.

Johannesburg Electric Lighting.

The following figures, taken from a paper which was read recently by Professor J. H. Dobson before the Institute of Electrical Engineers on "The Distribution Plant of the Johannesburg Municipal Electric Supply System," convey some idea of the growth of the system since 1909, and of the present dimensions of the electric supply undertaking:

	1909.	1914.
Total number of connections to mains	5,720	16,091
Total number of meters on system ...	5,753	17,235
Total units consumed	11,316,874	24,943,859
Maximum load (k.w.)...	5,400	10,900
Total number of street lamps	5,340	7,100

From a perusal of the statistics in Garcke's Manual for 1915-16, it is seen that the units consumed in, and the number of consumers connected to, the Johannesburg electric distribution system is approximately equivalent to those on the whole of the other municipal undertakings in South Africa.

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LATEST MINING NEWS.

Rezende Mines—Lonely Output—Selukwe Columbia—Anglo-French Matabeleland—Rhodesian Cement—

The report of the Rezende for the September quarter shows that 28,800 tons were milled, the revenue being £26,910, or 18s. 8·247d. per ton, operating costs, £22,056, or 15s. 3·779d., and profit £4,854, or 3s. 4·448d. Capital expenditure totalled £2,505. The development accomplished totalled 1,715 ft. The 1,020 ft. level east drive has disclosed a lengthening of the pay chute on this horizon. The length of pay chute on this level up to the present is 724 ft. compared with 480 ft. length on 900 ft. level. The quarter's development was sampled over 125 ft., averaging 11·9 dwts. over 52 in. Diamond drilling operations in the eastern section intersected the reef, giving the following values: No. 1 hole at 105 ft., value 9·5 dwts. over 40 in.; No. 2 hole at 148 ft., value 2·7 dwts. over 50 in.

* * * *

The output of gold from the Lonely Mine for the month of November was as follows:—Mill ran 578 hours; crushed, 4,230 tons; yield of fine gold, 578·890 ozs.; value, £2,433 13s. 2d.; slimes treated, 4,230 tons; yield of fine gold, 2,034·052 ozs.; value, £8,553 19s. 5d.; total recovery of fine gold, 2,612·942 ozs.; total value, £10,987 12s. 7d.; profit, £2,988.

* * * *

The Yankee Doodle mine having been tributed, operations of the Selukwe Columbia during the twelve months ended June 30 were confined to the Wonderland group of claims. Developments gave encouraging results, proving greater lengths and better values of the ore chutes at the 2nd level in the Danga and Chimborazo sections than in the 1st level in both cases. Ore reserves are 26,106 tons at 11·51 dwts. Three months' operation of the reduction plant resulted in the winning of gold to the value of £7,083. Working costs, however, exceeded this amount by £82. The poor result is attributed partly to the absorption of gold by the plant and partly to an ineffective method of treatment of the concentrates. Scarcity of labour and the increased cost of mining materials also had an unfavourable influence upon expenses. A dividend of 4d. per share, equal to 6⅔ per cent., is recommended. Sundry debtors, loans, bullion, and cash amount to £28,603, against which there are claims for £2,777.

* * * *

Mr. E. G. Mocatta, at the recent meeting of the Anglo-French Matabeleland in London remarked that " there is no padding of any sort, and the various assets stand in the books at what we believe to be their approximate value, with the important exception of our land asset, which we believe to be much greater in value than the amount at which it appears in the balance sheet." How conservatively the land is valued is shown by the fact that the 343,000 acres stand in the books at about £54,000, or a little over 3s. an acre, while the sales to date have averaged 9s. 8d. an acre. Since August, 1913, sales have been at the rate of 12s. 2d. per acre.

The Rhodesian cement works have now been producing cement for some months, and the plant is settling down into regular working routine. The factory is situated on the main line to Salisbury, about eight miles out from Bulawayo. The plant is designed to manufacture rather over 120,000 sacks annually, and it is anticipated that as soon as the war is over the demand will necessitate a duplication of the existing machinery. From the date of putting the cement on the market the chief difficulty has been to keep customers supplied, says the *Bulawayo Chronicle*. The limestone forming the major portion of the raw material used is obtained from a deposit situated on the Tuli road, whence it is conveyed by a 2 ft. gauge railway some 15 miles to the factory site. The clay with which it is mixed is quarried from near the factory. The cement-making machinery, comprising kominors (a type of ball mill), tube mills and the rotary kiln, were designed and supplied by Messrs. F. L. Smidth & Co., of Westminster, London, and Copenhagen, who are recognised as the leading cement engineers in Europe. Portions of the power plant were supplied by Messrs. Sykes & Co., while the electric light installation and many other details of the machinery were laid down by Messrs. Johnson & Fletcher. The whole of the materials used in the manufacture of the cement are obtained in Rhodesia with the exception of the sacks and the flints for grinding. Experiments are now being made with local flints.

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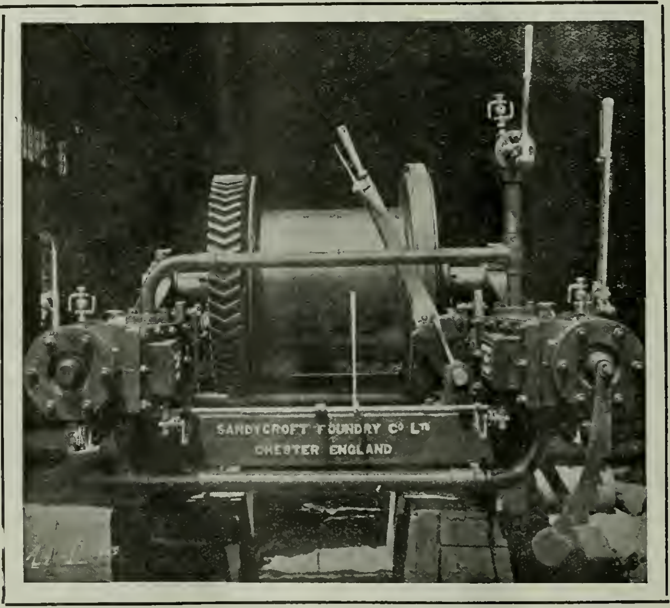

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Cheerful Disposition on 'Change—Timber in Demand from the Mines—Steel Ceilings Factory—Freights Higher Next Month.

THERE is very little doing on the Commercial Exchange, one member remarked that all the business for this week could easily be crowded into one session. Notwithstanding the lack of business the cheerful disposition engendered by the excellent dividends still continues, and according to Reuter's cable, Kafirs showed a hardening tendency in London on Monday of this week under the good dividend influences. It is also satisfactory to record that the Christmas trade of the town and reef also is good, and it might well be added under the excellent influences of the mines in the regular distribution of wages and the expenditure for stores, equipment, and so forth. At the time of writing many members have already left for the Christmas and year-end holidays, hoping for better business and brighter prospects in the coming year. Several firms are making out tenders, but they are somewhat perplexed in connection with the rise in shipping freights from the beginning of next year. Obviously it is easy to tender if the merchandise is already in Johannesburg, but when it has to come from oversea, that is another matter. For example, a merchant states that white lead should be 60s. per 100 lbs. in Johannesburg on the first of February next when that purchased in London at a higher prices arrives. However, it is likely that owing to the severe competition here the price may only be 58s., but a rise of 4s. per 100 lbs. has to be reckoned with when making out tenders. White lead is only given as a typical example of what is happening in many other lines; hence the difficulty of tendering generally. The outstanding feature at the moment is the difficulty—perhaps not much—that the mining people have to contend against in connection with the recommendations of the Commission as to earth tremors, as it is laid down that if the mines are better timbered throughout it will be a great preventative of tremors. Already the value of mining timber, especially just the class of poles required, has advanced in price with an upward trend, also Oregon pine is higher as well as all Baltic timber in bulk, which is getting scarce. Owing to this effort on the part of the mines, several sawmills in town are quite busy, considering the season of the year, when it is not an unusual thing to shut down a few days during the holidays, but on this occasion some places will only recognise the public holidays.

IRON, STEEL, AND GALVANISED GOODS.

The feature is still the advancing tendency in the galvanised iron trade. There is quite a fair business in all galvanised goods as between local merchants who are anxious to secure sorting up lines to keep their stocks in an up-to-date condition. For example a big line in galvanised ridging was written on Tuesday, simply for stock purposes and not for immediate use. The steel ceiling industry is progressing in Johannesburg, as it is pleasing to note that the firm who introduced one machine has now two at work, in their store situated in the City and Suburban township, and these two machines are capable of turning out 150,000 square feet per month. The best Welsh steel plates are imported especially for this work, and so far a quiet expansion has taken place from time to time. The firm in question secured the contract for steel ceilings for one of the Modderfontein mines, and once commenced, the management had the thing done properly by having steel ceilings throughout, in the offices and quarters, much to the satisfaction of the employees. The cost of steel ceilings to-day is 37s. 6d. per square of 100 feet, as compared with 32s. 6d. before the war. This includes fixing. Free dealings are taking place in barbed wire, for fencing purposes, all of which comes from America.

BUILDING MATERIALS AND GLAZED PIPES.

There is still a scarcity of cement, but not so acute as a month ago, and the factories reckon that the holidays will give them a little breathing space, therefore the orders on hand should be much reduced by the beginning of the year. Although there is less demand by building contractors for timber, there is a disquieting feeling about prices on the turn of the year, when freights will be raised, coupled with the present extra demand from the mines, therefore it is expected that long deals will be nearer a shilling per foot, as compared with to-day's price of 10¾d. for lengths over 16 feet. There is not a bad demand for the best stock bricks for delivery in January, also it is satisfactory to note that the Rand Brick and Pottery Company has just secured the contract from Queenstown for glazed pipes, which is expected to keep the works at Olifantsfontein employed for several months to complete the decent-sized contract. This order is a feather in our cap for an inland factory to obtain a municipal order in competition with the coast towns.

THE ROAD WAGON AND VEHICLE TRADES.

In visiting the big Christmas market, which all having interests in Johannesburg should do, to see for themselves what big business is being centralised at Newtown. For example, many of the stands down Bree Street as between the town and market have been built upon since last Christmas, also there are many yards containing wagons, carts, and every conceivable road vehicle, both new and second-hand. Whilst one has to pay a good price for a good substantial vehicle, yet owing to the severe competition, prices seem very reasonable indeed. And if perchance a second-hand vehicle is required the prices are such as to suit anyone's finances, always providing spot cash is forthcoming. Beyond the municipal market there are timber yards, flour mills, a candle factory, as well as a large number of miscellaneous stores and warehouses, most of which are directly fed by railway sidings, which means that they are there to stay, and can reasonably be expected to expand from year to year in Newtown.

REVISED PRICE LIST.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d., 19s. 6d. and 22s. 6d. (local do., 14s. 6d. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 2¾d. lb.; drill, 4¾d. lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.;

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by Class, Private Tuition and Correspondence
SOME 1914 RESULTS:—

MANAGERS	January and May	ALL Passed.
ELEC. ENGINEERS	February	60% ,,
MECH. ENGINEERS	June (Kimberley Centre)	ALL ,,
MINE OVERSEERS		Practically ALL ,,

NEARLY 200 SUCCESSES.
St. James' Mansions, Eloff Street.

3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8½d., 11 ft. 9d., 12 ft. 9½d.; 26 gauge, 6 ft. to 10 ft., all lengths about 8d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 30s. to 31s. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9½d.; over, 9¾d. to 10¾d. (Oregon, 10⅛d.); flooring, 4½ x ⅞ and 6 x ⅞, 4½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4½d.; pitch pine, 5s. 7d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 24s., boiled, 24s. per 5 galls.; white lead, 52s. 6d. to 54s. per 100 lbs.; turps., 46s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yd.; 3/20 coils of wire, 26s.; do., 3/22, 22s.; tubing, 12s. to 13s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. 6d. per 100; P.O. insulators 18s.; motors, 3 h.p., about £30 new.

Oceana Consolidated.

The twentieth ordinary general meeting of the Oceana Consolidated Company, Ltd., was held in mail week at the Cannon Street Hotel, London, E.C., Sir Westby B. Perceval, K.C.M.G. (chairman of the company) presiding. The Chairman, in moving the adoption of the report, said that the reduction of the capital was now a *fait accompli*, and the issued share capital now stood at £512,632, while the amount at which the assets appeared in the balance sheet had been correspondingly reduced. A portion of the profit for the year had been absorbed in the process of reducing the capital. The sum of £119,498 appearing under the heading of loans against securities represented, with the exception of £350, the indebtedness of the company to its bankers. Shareholders were told at the meetings in June that the arrangement made with the bankers, under which the company's requirements for the period of the war and six months after its termination were secured, involved by way of security to the bank an immediate issue of debentures. He was pleased to say, however, that the company was able to arrange with their bankers to accept a deed of charge, instead of the debentures. No issue, perhaps, would ever be required: but should the necessity arise it was obviously better to fix the rate of interest and the terms at the time of issue, rather than at a date long antecedent to the time when they might have to be placed on the market. Since their meetings in June last no occasion had arisen to render it necessary to call upon their bankers for the extra borrowing facilities arranged for. A list of the company's investments was included with the report; their holdings were stated in each case, together with the present book values. Their interests in Transvaal Lands represented a very substantial figure; but naturally very few sales had been effected during the past year, although the few that had been made were at a satisfactory figure. Their farms aggregated over 1,000,000 acres, and the directors were now engaged in preparing the scheme for throwing them open for settlement. In conclusion, the Chairman stated that they had received proxies representing roughly 440,000 shares.

Reported Diamond Deal.

We learn, says the London *Financial News*, that negotiations are proceeding, and are all but concluded, for the transfer of an important diamond mine, now dormant, from its present owners to another big group in the diamond trade. It is further reported that when the deal is effected the mine will be worked at its true value for the benefit of the shareholders, and that it will speedily return to the list of the dividend-payers.

WRIGHT'S ROPES.

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(Incorporated in the Transvaal.)

DIVIDEND No. 16.

NOTICE IS HEREBY GIVEN that an Interim Dividend—No. 16—of Seven and one-half per cent. (1s. 6d. per share), has been declared by the Board, payable to all shareholders registered in the Books of the Company at the close of business on the 31st day of December, 1915.

The Share Transfer Books will be closed from the 1st day of January to the 7th day of January, 1916, both days inclusive.

The Dividend Warrants will be posted to Shareholders from the Head Transfer Office on or about the 15th day of January, 1916.

By Order of the Board.
Transvaal Consolidated Land and Exploration Co., Ltd.,
Secretaries.
L. G. HEARD, Business Manager.
Head Office: The Corner House,
Johannesburg, December 22, 1915. 25073

THE WEEK IN THE SHAREMARKET.

Holiday Tone More in Evidence—Modderfonteins Favoured—Tins and Diamonds Disregarded.

THE market opened in a dull sort of way this week, showed some firmness on Tuesday, and was somewhat more active on Wednesday, when selling orders from London caused some movement. The Modderfontein stocks were somewhat conspicuous as a strong feature in the middle of the week, and the turnover was better than at the commencement of the week. Diamond and tin shares showed practically no animation. The spirit of the holiday season, subdued as it naturally is in these times, is nevertheless in evidence in the listless tone of the House.

	Wed. 15th.	Fri., 17th.	Sat., 18th.	Mon., 20th.	Tues., 21st.	Wed., 22nd.
African Farms	7 3	7 2*	7 0*	7 0	7 0*	7 0*
Apex Mines	7 0*	7 6†	7 6†	7 6†	7 6†	7 0*
Aurora Wests	—	8 6*	8 6*	8 6*	8 6*	8 6*
Bantjes Cons.	6 0*	6 0*	6 0*	6 0	6 3*	7 3
Brakpan Mines	65 6B	65 6*	65 6*	65 0*	65 6*	66 6*
Breyten Collieries	—	20 0*	20 0*	20 0*	20 0*	20 0*
Brick and Potteries	—	5 0*	—	5 0*	—	5 0*
Bushveld Tins	—	—	—	—	0 2†	0 2†
Cassel Coals	18 0A	20 0*	20 0A	21 0†	—	—
Cinderella Cons.	4 0*	4 3*	4 6*	4 6*	4 6*	4 6*
City and Suburbans	40 0*	40 0*	39 6*	40 6†	39 0*	38 9*
City Deeps	72 6*	71 9A	72 6*	71 6*	71 6*	72 6
Cloverfield Mines	5 9*	6 3†	5 9*	6 0	5 10*	5 10*
Clydesdale Collieries	13 6*	13 0*	13 6*	13 6*	13 6*	13 6*
Concrete Construction	—	2 6†	2 6†	2 6†	2 6*	—
Cons. Investment	—	—	—	—	13 6*	—
Cons. Langlaagtes	36 0*	36 6*	37 0	36 6*	36 6*	36 6*
Cons. Main Reefs	19 3*	19 3*	19 6	19 6*	19 6*	19 6*
Cons. Mines Selection	13 0*	13 0*	13 0	13 0*	13 3*	13 3*
Coronation Collieries	—	25 0*	25 0*	—	25 0*	—
Coronation Freeholds	0 3*	0 3*	0 3*	0 2*	0 3†	0 3†
Crown Diamonds	2 0*	2 3*	2 3*	2 3*	2 3*	2 3*
Crown Mines	—	—	—	60 0*	60 0*	—
Crown Mines Debentures	£99*	£99*	—	—	£98*	£99*
Durban Rood. Deeps	—	—	—	—	—	15 0*
East Rand Centrals	3 0*	3 0*	3 0*	3 0*	—	3 0*
East Rand Coals	2 1*	2 0*	2 2†	2 1*	2 0*	2 0*
East Rand Deeps	—	1 2*	1 1*	—	1 1*	—
East Rand Minings	6 6*	6 9	6 6*	6 6*	6 6*	6 6*
East Rand Props.	21 0*	21 3*	21 3*	21 0*	21 0*	21 0*
East Rand Debentures	—	£82½*	£82½*	—	£82½*	—
Eastern Gold Mines	1 4†	1 0*	1 1*	1 1*	1 1*	1 1*
Frank Smith Diamonds	1 5*	1 5	1 5*	1 5*	1 5*	1 5*
Geduld Props.	35 6B	35 0	34 9	34 9	34 9	34 6*
General Minings	7 0*	7 0*	7 0*	7 0*	7 0*	7 0*
Glencairn Main Reefs	2 0*	2 3*	—	—	2 6*	2 6*
Glynn's Lydenburgs	—	—	9 0*	9 0*	10 0*	10 0
Goerz and Co.	—	—	12 0*	—	12 0*	—
Government Areas	30 3	30 6	30 0*	30 3*	30 6	30 3
Jupiters	7 0†	6 6*	6 6*	6 6*	6 6	6 6*
Klerksdorp Props.	1 5*	1 5*	1 7*	1 7*	1 7*	1 6*
Knight Centrals	10 10*	10 7*	10 7	10 8	10 9	10 7*
Knights Deeps	—	22 6*	22 6*	22 6*	21 0*	21 0*
Lace Props.	4 1*	4 0*	4 0*	4 4	4 3*	4 0*
Langlaagte Estates	—	—	17 0	—	—	—
Luipaardsvlei Estates	—	7 6†	7 6†	—	—	7 6†
Lydenburg Farms	6 0	5 9*	5 8*	5 9	—	5 6*
Main Reef Wests	6 0	6 3	6 3*	6 5*	6 5*	6 3*
Meyer and Charltons	107 6*	110 0*	110 0*	111 3*	115 0*	117 6*
Middelvlei Estates	1 0*	1 0*	1 0*	1 0*	1 0*	1 4†
Modderfontein B.	118 0*	119 0*	121 0	120 0	121 3†	118 6*
Modder Deep Levels	—	112 6	112 6	110 0*	111 6	112 6
New Boksburgs	—	—	1 0*	0 10*	—	0 9*
New Eland Diamonds	12 0†	—	8 0*	8 0*	8 0*	—
New Era Cons.	7 6	7 6	7 3*	7 3	7 3*	7 6
New Geduld Deeps	3 1	3 0*	3 0*	3 0*	3 0*	3 0*
New Gochs	—	—	13 0*	13 0*	—	13 0*
New Kleinfonteins	25 9A	25 9	25 3*	25 3*	25 6*	25 6
New Modderfonteins	300 0*	310 3*	302 6*	305 0	305 0*	310 0
New Primrose	12 6†	—	—	—	—	—
New Rietfonteins	0 4*	0 3*	0 4*	—	0 3*	0 4*
New Unifieds	—	—	—	—	16 6†	14 9*
Nourse Mines	16 6*	—	16 6*	—	—	—
Pretoria Cements	45 0*	45 0*	46 0	45 0*	45 0*	45 0*
Princess Estate	3 0*	3 0*	3 0*	—	—	—
Rand Collieries	2 0*	2 0*	2 0*	—	2 3*	2 6
Rand Klips	5 5	5 4	5 2*	5 2*	5 2*	5 3*
Rand Nucleus	1 4	1 4*	1 5*	1 4*	1 5*	1 4*
Randfontein Deeps	3 2	3 2*	3 1*	3 2	—	3 2*
Randfontein Estates	13 0*	14 0†	—	—	—	12 6*
Roberts Victors	7 0*	7 0*	7 0*	7 6*	9 0*	10 0*
Robinson Deeps	21 0*	21 6*	21 0*	21 0*	21 0*	21 0*

* Buyers. † Sellers. A Odd lots.

	Wed. 15th.	Fri., 17th.	Sat., 18th.	Mon., 20th.	Tues., 21st.	Wed., 22nd.
Rooiberg Minerals	16 0†	15 0*	15 0	15 0	14 0	14 0*
Roodepoort Uniteds	4 6*	4 6*	4 6*	4 6*	4 6*	5 0
Shebas	2 0†	2 0†	2 0†	—	2 0†	1 9*
Simmer Deeps	—	1 8*	1 7*	1 7*	1 8*	2 0†
S.A. Breweries	—	—	—	—	—	32 6†
S.A. Gold Mines	—	—	12 6†		—	—
S.A. Lands	3 3*	3 2*	3 2*	3 2*	3 2*	3 2*
Springs Mines	35 6	36 3	35 9	35 6*	37 6*	37 0
Sub Nigels	11 0*	11 0*	11 0*	10 6	10 9*	10 9
Swaziland Tins	—	—	—	21 0†	—	—
Transvaal Coal Trust	45 9	46 6	46 3*	45 9*	47 6*	47 9*
Transvaal Lands	—	—	—	—	—	12 6†
Transvaal G.M. Estates	26 6*	26 6*	25 6*	26 6	26 6*	26 6*
Tudors	—	—	—	—	—	2 0†
Van Dyks	1 0*	1 2*	1 0*	—	1 9*	1 7*
Van Ryn Deeps	57 9	58 3	58 0	58 3	58 3	58 3
Van Ryn Estates	—	—	—	50 0*	50 0	—
Village Deeps	35 0*	—	34 6*	35 0*	34 6*	34 9*
Vogel. Cons. Deeps	0 10*	0 9*	0 9*	0 8*	0 8*	0 10
West Rand Cons.	8 6*	8 6*	8 6*	8 6*	8 6*	—
Western Rand Estates	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Witwatersrands	55 0*	56 0*	58 0†	55 0*	57 6†	57 6†
Witwatersrand Deeps	26 0*	27 0*	26 9	26 6*	27 0†	27 6†
Wolhuters	10 0†	—	10 0†	9 6*	9 6*	9 6
Zaaiplaats Tins	10 6	10 6	10 3*	10 3*	—	10 3*

* Buyers. † Sellers. A Odd lots.

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Engineering Notes and News.

Large Locomotives for the South African Coal Traffic.

A new series of exceptionally large and powerful locomotives, of the Mallet articulated compound type, has been designed by Mr. D. A. Hendrie, the chief mechanical engineer of the South African Railways, and built by the North British Locomotive Company, Ltd., of Glasgow. These locomotives are primarily intended for the haulage of the Natal coal traffic over the heaviest sections of line, and also the general freight traffic to and from the Rand district. The locomotives are of the 2-6-6-2 wheel arrangement, the front group of wheels being driven by the low-pressure cylinders, 31½ in diameter and 26 in. stroke, whilst the rear group is driven by the high-pressure cylinders, 20 in. diameter by 26 in. stroke. Steam is distributed to all of the four cylinders by Walschaert's valve gear, actuating piston valves working above the cylinders. The front bogie wheels are 2 ft. 4½ in. diameter, the coupled wheels 4 ft. diameter, and the hind wheels 2 ft. 9½ in. The rigid wheelbase is 8 ft. 8 in. and the total engine wheelbase is 43 ft. 7 in. The boiler is of very large proportions, and, with the superheater, contains 3,827 sq. ft. of heating surface. The firegrate area is 53 sq. ft. At 50 per cent. of the working pressure (200 lb. per square inch) the tractive force is no less than 43,330 lb. A system of spring equalisation is provided which embraces the springs of the bogie wheels at front and rear. These wheels have their springs connected with those of the foremost and hindmost coupled wheels. The engines are fitted with a change valve, which enables them to be worked either simple or compound, at the will of the driver. There is also a steam brake, and the tender is fitted with the automatic vacuum brake. Although these engines are built for the 3 ft. 6 in. gauge (the South African standard), they have each an adhesion weight of no less than 106 tons, and the weight in working order is 128 tons 5 cwt. The tender is carried upon two four-wheeled bogies, the wheels of which are 2 ft. 9½ in. diameter. The bogie wheelbase is 16 ft. 9 in. The tank has a carrying capacity of 4,250 gals. of water, and 450 cu. ft. space for coal. In working order, the tender weighs 51 tons 8 cwt. Engine and tender combined have a weight, in working order, of no less than 179 tons 13 cwt. 1 qr., a wheelbase of 70 ft. 10¼ in., and a total length of 81 ft. 2 in. over buffers.

Diesel Engines in South Africa.

An interesting paper was read at the recent conference of municipal engineers at Johannesburg. It was by Mr. William Bellad Ellis, and concerned the "Diesel Engines and Electric Fuels." "This paper is not meant to advertise any particular scheme or maker of Diesel engine; in fact, the efficiencies of Diesel engines are very much the same, provided they are made by a reliable maker, and if I show you what can be done by a small staff of moderately-paid men, it will help to emphasise the economical possibilities of these engines. For instance, at one town in the Eastern Province there is a manager who is also an engineer, an assistant who is a mechanic, an engine attendant and switchboard attendant—four men in all—who carry out the whole duties and have maintained an uninterrupted supply, day and night, for three years without any hitch or breakdown whatever. This is done quite easily and without undue strain upon anyone (except perhaps the manager, who sometimes takes a shift, and has somewhat longer hours than his staff). But to resume. Until quite recently, no member of this staff had put in more than 48½ hours per week, and the station could, in addition, have doubled its day load with the additional cost of fuel oil and a small quantity of lubricant, and again, although only in its third year, a third engine has been added to cope with the increasing load. This engine was erected by the resident staff—no expensive traveling expenses bringing out erectors from Europe was necesasry. This is a most important point, and this by reason of the simplicity of erection, and the excellent drawings supplied by the makers; indeed, there has been quite an air of mystery when imported erectors have been on the job, which is, after all so much bunkum, and tends to make engineers shy of adopting this engine for fear of some great intricacies or unlooked for faulty development. There is absolutely no necessity for any such qualms of conscience when contemplating the introduction of this engine into any scheme, because a good fitter can easily carry out the erection by paying strict attention to his working instructions supplied by the makers. With regard to the working principles and efficiencies of Diesel engines, I feel it is almost presumption to give this influential gathering of engineers any information on the subject, as most of you must be conversant with the working principles of a Diesel engine, but for those who have not had an opportunity of studying the subject, I will now proceed by giving you some of the efficiencies obtainable with Diesel engines as a prime mover, and also any tips and running experiences which are the result of close contact with these engines since their advent in 1908 into South Africa, together with a study of fuel oils (a most important matter in connection with Diesel engines, and indeed with engineers generally in steam-driven stations). These engines were first introduced into South Africa for power station use at Uitenhage, and because it was, so to speak, a dive into the unknown for South Africa, it received opposition from the Government Department at that time controlling these matters. However, we ultimately persuaded the powers that be to allow the experiment, with the result that there are now—as you may know—about 30 engines of this type in daily use in South Africa, and prejudice therefore appears to be dying down."

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1915.
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The Week's Meetings.

BREYTEN COLLIERIES.

Effects of the War.

Reduced Output.

Development Good.

The sixth ordinary general meeting of shareholders in the Breyten Collieries, Ltd., held on the 17th inst., was attended by Messrs. D. Christopherson, (chairman), F. Leslie Brown, F. H. Tarlton, W. S. Smith, J. E. Orr, C. Hely-Hutchinson, J. E. Kent, F. M. Cowan and G. C. White (secretary), representing personally and by proxy 49,774 shares out of an issued capital of 90,000 shares.

The chairman said: The report and accounts now before you show that the net profit for the financial year just closed, after making provision for Government profits tax and income tax, amounted to £18,261. Of this amount £10,125 has been paid out in dividends during the financial year ended on the 31st of October, 1915, representing 11¼ per cent. on the capital of the company, £2,940 placed to reserve account and the balance was carried forward. Comparing these results with those of the previous year, it will be seen that the profit was reduced by some £5,293. This is due to a reduction in the output for the year of 38,835 tons of coal and to increased working costs. The rise in costs is due primarily to the war, which has increased the prices of the stores and materials consumed by the mine, while the irregularity of the supply of railway trucks due to the exigencies of military requirements during the campaign in German South-West Africa and the rebellion in South Africa seriously hampered the working of the company. Praise, however, is due to the Railway Administration for the able manner in which they carried on during the trying and difficult period in question. In addition to the increased costs directly attributable to the war there has been a material increase in the wages paid to the native labourers. The total increase in working costs as compared with the previous year is equivalent to 6.28 per cent. Owing to the considerable rise in sea freights and the very limited number of steamers offering tonnage, the coal export trade through Delagoa Bay has been seriously affected. During the year under review our colliery effected no export business. Turning to the balance sheet, the only changes of importance on the credit side are railway siding and equipment, increase of £2,803, representing an additional locomotive purchased, and an increase in stores on hand of £984, whilst, on the debtor side, reserve account has been increased by a further appropriation of £2,940 and a sum of £1,724 has been earmarked to create a fund for additions to and renewals of machinery and plant. It is proposed to supplement this fund from time to time, as dividends are declared by further appropriations from profits. From the superintending engineer and manager's reports you will note that the position at the colliery may be considered satisfactory. The overlying seam encountered in No. 5 adit and the maintenance of the width of the seam in No. 6 adit, together with the maintenance of the average calorific values, are very encouraging. With regard to the overlying seam in No. 5 adit, Mr. Leslie in his report states that the adit was being deflected into the hanging wall for the purpose of opening out this seam. This work has been carried on, and the seam, still of excellent quality has been met with. This should enable the colliery to increase the rate of development considerably, and thereby still further strengthen the underground position. As regards No. 6 adit, it is satisfactory to be able to inform you that this adit area looks like commanding a more important area of profitable coal than was at first anticipated. From the analyses obtained from the workings in July last there is practically no change in the calorific value of the coal, so I think it can be claimed that the position of the colliery is at the moment quite satisfactory. As you will have seen by to-day's papers, a further interim dividend of 7½ per cent. has been declared for the six months ending 31st December. This dividend, together with the one declared for the six months ending 30th June, 1915, makes a total of 16¼ per cent. for the 12 months as from the 1st January of this year. In conclusion, I should like to express the thanks of the board to Mr. Lewis, the manager, for the able manner in which he has handled the work on the property. For reasons already stated, there have been periods during the past year of great difficulty, which the manager and his staff met with energy, thereby largely minimising the effects of same.

The report and accounts were adopted.

The report showed that during the past year Mr. F. D. P. Chaplin resigned his seat on the board, and in terms of the agreement dated 22nd August, 1910, between the company, Messrs. Webber and Wentzel, on behalf of principals, and Mr. J. B. Macdonald, the Consolidated Gold Fields of South Africa, Ltd., nominated Mr. F. Leslie Brown to fill the vacancy. Messrs. F. Hedley Tarlton and J. E. Orr retired from the board, but in terms of the agreement mentioned above they will continue in office.

Messrs. Douglas Low and Co and Mr. F. A. Stokes were reappointed auditors.

ELANDSFONTEIN ESTATE.

The 22nd ordinary general meeting of shareholders in the Elandsfontein Estate Co., Ltd., took place on the 17th inst. Mr. F. Leslie Brown presided.

The Chairman said:—The net profit for the year amounted to £2,384 which, added to the balance brought forward from last year, enabled your directors to declare two dividends of 5 per cent. each absorbing £3,000 and to carry forward £1,070 to the current year's account. You will note from the profit and loss account for the year that the revenue from estate owner's share of licences has fallen some 18 per cent. below last year's figures. This is due to the fact that during the year some 1,150 claims have been abandoned by their owners. The majority of these claims were abandoned in the latter half of the financial year and consequently the revenue from this source for the current year will show a further decrease on this account. The total future loss of revenue from this source as compared with the financial year ended October 31, 1914, is some 40 per cent., or £1,800 per annum. Messrs. C. Davies and H. Newhouse were re-elected to the directorate. During the year Mr. F. D. P. Chaplin resigned his seat as a director, and Mr. F. Leslie Brown was elected to fill the vacancy; the election was confirmed Messrs. Douglas, Low and Co. were reappointed auditors.

CAROLINA ASBESTOS.

The ninth ordinary general meeting of shareholders in Carolina Asbestos Co., Ltd., was held in the Consolidated Gold Fields Buildings on the 17th inst. Mr. F. Leslie Brown presided.

In moving the adoption of the report and accounts, the Chairman said that no work had been done by the lessees during the year under review. As shareholders were informed at the last meeting, the present option was extended indefinitely until such time as the war might permit of the lessees restarting operations. Expenditure had in the meantime been kept as low as possible and amounted for the year to £13. The election of Mr. F. Leslie Brown as a director in the place of Mr. F. D. P. Chaplin was confirmed. Messrs. I. Rappaport and D. Christopherson were re-elected directors, and Messrs. Douglas, Low and Co. were reappointed auditors.

S.A. ALKALI, LTD.

The third ordinary general meeting of shareholders of the South African Alkali, Limited, was held in the boardroom, Consolidated Buildings, Fox Street, Johannesburg, on the 15th inst., presided over by Mr. Llewellyn Edwards. The Chairman, in the course of his remarks, said that at the time of the company's last meeting, its practical work consisted in (a) mining, calcining, and marketing crude soda ore at Zoutpan; and (b) supplying a proportion of that crude product to the refining works at Ophirton, and there manufacturing therefrom pure soda crystals and other valuable products of soda, which were in demand in this country and which have hitherto had had to be imported from oversea. Both these projects, Zoutpan and Ophirton, were perfectly justifiable and it was his strong opinion that the directors would not have been exercising their discretion in the interests of shareholders had they not tried them both. Zoutpan had proved a success, and Ophirton, which had proved a failure, had been closed. On the 30th of September this year Zoutpan showed a working profit of £3,535 0s. 2d. A dividend could not yet be declared as considerable leeway had to be made up, but Mr. Edwards entertained no doubt that that would be done at no distant date, as the company's future bade fair to be a very prosperous one. The report and balance sheet were adopted.

BREYTEN COLLIERIES, LIMITED.

(Incorporated in the Transvaal.)

REPORT OF THE DIRECTORS

For the year ended 31st October, 1915.

Submitted at the Sixth Ordinary General Meeting of Shareholders, held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, on Friday, 17th December, 1915, at 11.30 o'clock in the forenoon.

Gentlemen.—Your Directors beg to submit their Report, together with the audited Accounts, for the year ended 31st October, 1915.

CAPITAL.

The capital of your Company, which is unaltered, consists of £100,000 in 100,000 shares of £1 each, of which 90,000 shares have been issued fully paid and 10,000 shares are held in reserve.

PROPERTY.

Your Company holds the under-mentioned leases (which have been ceded to it) of certain coal rights, together with facilities for working, and the cost of these leases stands in your books at £22,184 19s. 1d.:—

(1) M. J. D. Steyn's lease, dated 6th September, 1908, of 1,585 morgen 33 square roods on the farms Bankfonteien No. 14 and Klipfontein No. 144.

(2) L. Nel's lease, dated 9th February, 1909, of 500 morgen on the farm Schaapkraal No. 7.

(3) P. Berelowitz's (formerly L. and J. A. Nel's) lease, dated 9th February, 1909, of 2,374 morgen 69 square roods on the farm Bankfontein No. 14.

The above farms are situated in the Ermelo District, Transvaal, and the leases are as follows:—

As to No. 1.—For a period in the first instance of 20 years, with the right of renewal for a further period of 20 years, and thereafter further right of renewal on terms to be arranged.

As to Nos. 2 and 3.—For a period in the first instance of 20 years, with right of renewal for two further periods of 20 years each.

ACCOUNTS.

The following shows in summarised form the receipts and expenditure during the year under review:—

			£ s. d.
Receipts.			
Cash on hand at Nov. 1, 1914		£846 14 11	
Profit from operations		18,261 5 6	
Expenditure.			
Capital Expenditure.—			
Buildings—			
Accommodation for visitors			0 2 5
T. A. Clow's House			160 0 0
Railway Siding and Equipment			2,805 16 1
Live Stock, Vehicles and Harness			25 0 0
Gross Expenditure			2,990 18 6
Less.—			
Depreciation written off Furniture, Instruments, Live Stock, Vehicles and Harness, and debited to Profit and Loss Account			94 2 5
			2,896 16 1
Dividends paid—			
Dividend No. 4 of 2½ p.c., declared 15th Dec., 1914	£2,250 0 0		
Dividend No. 5 of 8¾ p.c., declared 18th June, 1915	7,875 0 0		
			10,125 0 0
Balance			6,086 4 4
		£19,108 0 5	£19,108 0 5

The above balance, viz.: is accounted for as follows:—	£6,086 4 4	
Increase in Stores on hand		£983 15 7
Decrease in Payments in advance	30 11 1	
Increase in Sundry Debtors' Balances		1,993 5 8
Decrease in Sundry Creditors' Balances		416 12 [illegible]
Amounts set aside for Additions and Renewals Fund	1,724 15 2	
Bank Overdraft liquidated during year		3,581 11 6
Bash Balances on hand at October 31, 1915		866 5 7
	£7.841 10 7	£7,841 10 7

The overdraft at Bankers of £3,581 11s. 6d., which appeared in the Balance Sheet as at 31st October, 1914, has now been liquidated.

It will be observed from the Appropriation Account that the profit for the year under review amounted to			£18,261 5 6
which, added to the credit balance at 31st October, 1914, of			6,200 15 5
makes a total of			24,462 0 11
out of which there has been distributed in respect of Dividend No. 4	£2,250 0 0		
and Dividend No. 5	7,875 0 0		
		£10,125 0 0	
and appropriated to Reserve Account from profits and applied to meet Capital Expenditure		2.940 8 9	
			13.065 8 9
leaving a balance at credit of Appropriation Account at 31st October, 1915, of			£11,396 12 2

OPERATIONS.

The Superintending Engineer's and Manager's Reports, attached hereto, give a resumé of the operations carried out at the mine during the year.

INVESTMENTS.

Your investments stand in the books at £310 16s., and consist of 168 shares in the Witwatersrand Native Labour Association, Limited, on which 12s. per share and a deposit of 25s. per share have been paid.

DIRECTORATE.

During the past year Mr. F. D. P. Chaplin resigned his seat on the Board, and in terms of the agreement dated 22nd August, 1910, between the Company, Messrs. Webber and Wentzel, on behalf of principals, and Mr. J. B. Macdonald, The Consolidated Gold Fields of South Africa, Limited, nominated Mr. F. Leslie Brown to fill the vacancy thus caused.

In accordance with the provisions of the Articles of Association, Messrs. F. Hedley Tarlton and J. E. Orr retire from the Board, but in terms of the agreement mentioned above these gentlemen continue in office.

AUDITORS.

It will be necessary to fix the remuneration for the past year's audit, and to appoint Auditors for the current year in the places of the retiring Auditors, Messrs. Douglas, Low and Co., and Mr. F. A. Stokes, who are eligible and offer themselves for re-election.

GENERAL.

Mr. W. H. Lewis and Mr. D. W. Rossiter continued to act as your Company's Mine Manager and Business Manager respectively during the year, and your Directors take this opportunity of expressing their appreciation of the serivces rendered by those gentlemen.

D. CHRISTOPHERSON (Chairman),
F. HEDLEY TARLTON,
P. S. WIMBLE. Directors.

The Consolidated Gold Fields of S.A., Limited, Secretaries
per G. C. WHITE.

Jonannesburg, 7th December, 1915.

Breyten Collieries, Limited—continued.

BALANCE SHEET at 31st October, 1915.

Dr.		
To Capital ...		£90,000 0 0
100.000 shares of £1 each authorised ...	£100.000 0 0	
Less 10.000 shares of £1 each held in reserve ...	10.000 0 0	
,, Premium on Shares, less Discounts allowed ...		14,324 5 6
.. Reserve Account (Appropriations from Profits for Capital Expenditure) ...		43.295 0 10
Balance at 31st October, 1914 ...	40.354 12 1	
Add amount appropriated during year ...	2.940 8 9	
		147,619 6 4
,. Fund for Additions to and Renewals of Machinery and Plant ...		1,724 15 2
Transfers from Sundry Working Costs Suspense Accounts.		
.. Sundry Creditors ...		13,771 8 3
.. Dividends Unclaimed (per contra)		19 13 9
.. Balance from Appropriation Account ...		11,396 12 2
Contingent Liabilities.		
8s. per share unpaid on 168 shares of £1 each in the Witwatersrand Native Labour Association, Limited ...	£67 4 0	
On the house of J. C. Samuels...	180 0 0	
	£247 4 0	
		£174,531 15 8

		Cr.
By Property (at cost) ...		£22,184 19 1
Coal Rights held under leases on farms Bankfontein, Klipfontein, and Schaapkraal, as per Balance Sheet at Oct. 31, 1914.		
,. Expenditure on—		
Buildings ...	£13,539 9 5	
Surface Haulage to Screening Plant ...	15 608 12 8	
Coal Cutting Machine Plant ...	3.647 18 3	
Railway Siding and Equipment ...	34.900 0 1	
Screening and Picking Plant ...	11,106 4 0	
General Underground Plant ...	550 7 10	
General Surface Plant ...	37,441 2 4	
Underground Haulage ...	5.222 5 0	
Water Supply ...	3,418 7 8	
		125.434 7 3
		147,619 6 4
.. Stores ...		6,414 10 11
.. Furniture and Investments ...		157 19 11
,. Live Stock, Vehicles and Harness...		135 5 3
.. Share Investments (at cost) ...		310 16 0
.. Payments in Advance ...		789 15 9
.. Sundry Debtors ...		18.218 2 2
,, Cash at Bankers, London ...		19 13 9
For Dividends unclaimed (per contra).		
,, Cash ...		866 5 7
At Bankers: Johannesburg, London and Breyten.		
		£174,531 15 8

The Consolidated Gold Fields of S.A., Limited, Secretaries.
per G. C. WHITE.

D. CHRISTOPHERSON (Chairman),
F. HEDLEY TARLTON.
P. S. WIMBLE. Directors.

REPORT.

To the Shareholders of
BREYTEN COLLIERIES, LIMITED.

We report that we have examined the above Balance Sheet with the Books and Vouchers of the Company in Johannesburg for the year ended 31st December, 1915, in which have been incorporated the audited Accounts received from London and the Accounts received from the Colliery, and have obtained all the information and explanations we have required as Auditors. In our opinion, such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us, and as shown by the Books of the Company.

FRANK A. STOKES.
DOUGLAS, LOW & CO.,
Incorporated Accountants, Auditors.

Johannesburg, 4th December, 1915.

PROFIT AND LOSS ACCOUNT for the year ended 31st October, 1915.

Dr.			
To Expenditure on Renewals and Replacements ...			£190 3 0
,, Interest, Commission and Exchange			182 11 8
,, Amounts written off ...			599 10 7
Bad Debts and Depreciation on Furniture, Live Stock and Vehicles, Stores, etc., less sundry credits.			
,, Government of the Union of South Africa Taxes ...			1,906 14 8
Profits Tax ...		£714 16 0	
Estimated for year ended October 31, 1915 ...	£714 2 1		
Add Amount underestimated for year ended October 31, 1914 ...	0 13 11		
Income Tax...		1.191 18 8	
Estimated for year ended June 30, 1915	1.119 9 11		
Add Amount underestimated for year ended June 30, 1914	72 8 9		
.. Balance carried to Appropriation Account ...			18.261 5 6
			£21,140 5 5

Cr.	
By Coal Account, after deduction of Mining, Hauling and Screening Expenses, and all Mine and Management Charges ...	£20.498 4 10
.. Sundry Revenue ...	642 0 7
	£21,140 5 5

Breyten Collieries, Limited—continued.

APPROPRIATION ACCOUNT.

Dr.			Cr.	
To Dividends		£10,125 0 0	By Balance at October 31, 1914	£6,200 15 5
Dividend No. 4 of 2½ per cent., declared on 15th December, 1914	£2,250 0 0		,, Balance from Profit and Loss Account for year ended October 31, 1915	18,261 5 6
Dividend No. 5 of 8¾ per cent., declared on 18th June, 1915...	7,875 0 0			
,, Reserve Account		2,940 8 9		
Amount appropriated for Capital Expenditure.				
,, Balance carried to Balance Sheet...		11,396 12 2		
		£24,462 0 11		£24,462 0 11

Consolidated Langlaagte Mines, Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

DIVIDEND No. 5.

NOTICE IS HEREBY GIVEN that a Dividend of Twelve and One-half per centum (Two Shillings and Sixpence per share) has been declared payable to Shareholders registered at the 31st December, 1915, as soon as the necessary returns are received from the London Office.

The Transfer Books will be closed from the 1st to the 8th January, 1916, both days inclusive.

By Order of the Board,

Johannesburg Consolidated Investment Co., Ltd., Secretaries.
per FRANK HALL.

Head Office: Consolidated Building,
Johannesburg, 18th December, 1915. 24738

Witwatersrand Gold Mining Co., Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

DIVIDEND No. 23.

NOTICE IS HEREBY GIVEN that a Dividend of Twenty-five per centum (Five Shillings per share) has been declared payable to Shareholders registered at the 31st December, 1915, as soon as the necessary returns are received from the London Office.

The Transfer Books will be closed from the 1st to the 8th January, 1916, both days inclusive.

By Order of the Board,

Johannesburg Consolidated Investment Co., Ltd., Secretaries.
per FRANK HALL.

Head Office: Consolidated Building,
Johannesburg, 18th December, 1915. 24744

Van Ryn Deep, Limited.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

DIVIDEND No. 5.

NOTICE IS HEREBY GIVEN that a Dividend of Seventeen and One-half per centum (Three Shillings and Sixpence per share) has been declared payable to Shareholders registered at the 31st December, 1915, as soon as the necessary returns are received from the London Office.

The Transfer Books will be closed from the 1st to the 8th January, 1916, both days inclusive.

By Order of the Board,

Johannesburg Consolidated Investment Co., Ltd., Secretaries.
per FRANK HALL.

Head Office: Consolidated Building,
Johannesburg, 18th December, 1915. 24743

New Unified Main Reef Gold Mining COMPANY, LIMITED.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

DIVIDEND No. 15.

NOTICE IS HEREBY GIVEN that a Dividend of Ten per centum (Two Shillings per share) has been declared payable to Shareholders registered at the 31st December, 1915, as soon as the necessary returns are received from the London Office.

The Transfer Books will be closed from the 1st to the 8th January, 1916, both days inclusive.

By Order of the Board,

Johannesburg Consolidated Investment Co., Ltd., Secretaries.
per FRANK HALL.

Head Office: Consolidated Building,
Johannesburg, 18th December, 1915. 24742

New Primrose Gold Mining Co., Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

DIVIDEND No. 45.

NOTICE IS HEREBY GIVEN that a Dividend of Seven and One-half per centum (One Shilling and Sixpence per share) has been declared payable to Shareholders registered at the 31st December, 1915, as soon as the necessary returns are received from the London Office.

The Transfer Books will be closed from the 1st to the 8th January, 1916, both days inclusive.

By Order of the Board,

Johannesburg Consolidated Investment Co., Ltd., Secretaries.
per FRANK HALL.

Head Office: Consolidated Building,
Johannesburg, 18th December, 1915. 24741

Glencairn Main Reef Gold Mining Co., Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

DIVIDEND No. 18.

NOTICE IS HEREBY GIVEN that a Dividend of Five per centum (One Shilling per share) has been declared payable to Shareholders registered at the 31st December, 1915, as soon as the necessary returns are received from the London Office.

The Transfer Books will be closed from the 1st to the 8th January, 1916, both days inclusive.

By Order of the Board,

Johannesburg Consolidated Investment Co., Ltd., Secretaries.
per FRANK HALL.

Head Office: Consolidated Building,
Johannesburg, 18th December, 1915. 24740

Ginsberg Gold Mining Company, Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

DIVIDEND No. 25.

NOTICE IS HEREBY GIVEN that a Dividend of Seven and One-half per centum (One Shilling and Sixpence per share) has been declared payable to Shareholders registered at the 31st December, 1915, as soon as the necessary returns are received from the London Office.

The Transfer Books will be closed from the 1st to the 8th January, 1916, both days inclusive.

By Order of the Board,
Johannesburg Consolidated Investment Co., Ltd., Secretaries.
per FRANK HALL.

Head Office: Consolidated Building,
Johannesburg, 18th December, 1915.

Van Ryn Gold Mines Estate, Ltd.

(Incorporated in the United Kingdom.)

DIVIDEND No. 24.

NOTICE IS HEREBY GIVEN that the Board of Directors have declared an Interim Dividend of Seventeen and one-half per cent. (17½ per cent.) (3s 6d. per share), less Income Tax, for the half-year ending 31st December, 1915.

The Dividend now declared will be payable to all Shareholders registered on the 31st December, 1915. Dividend Warrants will be posted from London to Shareholders on the European Register on the 17th January, 1916, and to Shareholders on the South African Register from Johannesburg at the beginning of February.

Holders of Share Warrants to Bearer must present Coupon No. 24:—

In London. At the registered Office of the Company, 63-64, Winchester House, E.C.

In Paris: At the Credit Lyonnais, 19, Boulevard des Italiens.

The Coupons must be left for examination for four clear days

The Books of the Company will be closed from the 1st to the 11th January, 1916, both days inclusive.

By Order of the Board,
J. V. BLINKHORN, Local Secretary.

General Mining Buildings,
Marshall Square (P.O. Box 1173),
Johannesburg, 17th December, 1915.

New Goch Gold Mines, Limited.

(Incorporated in the Transvaal.)

DIVIDEND No. 7.

NOTICE IS HEREBY GIVEN that a Dividend of Five per cent (5 per cent.), equal to One Shilling (1s.) per share (making, together with the Dividend of 5 per cent. declared in June last, a total Dividend of 10 per cent. for the financial year ending 31st December, 1915), has been declared by the Board of Directors for the half-year ending 31st December, 1915, payable to all shareholders registered at that date and to holders of Coupon No. 7 attached to Share Warrants to Bearer.

Warrants in payment of the Dividend will be issued to European Shareholders from the London Office, and to South African Shareholders from the Head Office, Johannesburg, as soon as possible after the receipt at Head Office of the London Transfer Lists to the 31st December, 1915.

Holders of Share Warrants to Bearer will receive payment (1s. per share) in exchange for Coupon No. 7 at any of the undermentioned Offices of the Company:—

Head Office: General Mining Buildings, Johannesburg.

London Office: 63-64, Winchester House, E.C

Paris: At the Credit Lyonnais, 19, Boulevard des Italiens.

Coupons must be left for four clear days for examination, and may be presented any day after the 1st February, 1916.

The Transfer Registers will be closed from the 1st to the 7th January, 1916, both days inclusive.

By Order,
J. V. BLINKHORN, Secretary.

Head Office:
General Mining Buildings (P.O. Box 1173),
Johannesburg, 17th December, 1915.

Meyer and Charlton Gold Mining Company, Limited.

(Incorporated in the Transvaal.)

DIVIDEND No. 52.

NOTICE IS HEREBY GIVEN that a Dividend of Forty per cent. (40 per cent.) equal to Eight Shillings (8s.) per share, and a Bonus of Ten Shillings (10s.) per share (making together with the Dividend of 40 per cent. declared in June last a total Dividend of 80 per cent. and a Bonus of 10s. per share, for the financial year ending 31st December, 1915), has been declared by the Board of Directors for the half-year ending 31st December, 1915, payable to all shareholders registered at that date and to holders of Coupon No 35 attached to Share Warrants to Bearer.

Warrants in payment of this Dividend and Bonus will be issued to European Shareholders from the London Office, and to South African Shareholders from the Head Office, Johannesburg, as soon as possible after the receipt at Head Office of the London Transfer Lists to the 31st December, 1915.

Holders of Share Warrants to Bearer will receive payment (18s. per share) in exchange for Coupon No. 35 at any of the undermentioned Offices of the Company:—

Head Office: General Mining Buildings, Johannesburg.

London Offices: 63-64, Winchester House, E.C.

Paris: At the Credit Lyonnais, 19, Boulevard des Italiens.

Coupons must be left for four clear days for examination, and may be presented any day after the 1st February, 1916.

The Transfer Registers will be closed from the 1st to the 7th January, 1916, both days inclusive.

By Order,
J. V. BLINKHORN, Secretary.

General Mining Buildings (P.O. Box 1173),
Johannesburg, 17th December, 1915.

The Langlaagte Estate and Gold Mining Company, Limited.

(Incorporated in the Transvaal.)

DECLARATION OF DIVIDEND No. 51.

NOTICE IS HEREBY GIVEN that the Directors of this Company have declared a Final Dividend of Seven and a half per cent. (making a total of 15 per cent. for the year), payable to Shareholders registered on the 31st December, 1915.

Dividend Warrants will be posted to South African Shareholders from the Head Transfer Office, P.O. Box 1040, Johannesburg, and to European Shareholders from the London Transfer Agency, 30-31, St. Swithin's Lane, London, E.C., on or about 10th February, 1916.

DIVIDEND ON BEARER SHARES—COUPON No. 40.

Holders of Share Warrants to bearer are hereby notified that they will receive payment of the Dividend on presentation of Coupon No. 40, which is payable at the London Transfer Agency, as above, or negotiable with their Paris Correspondent, Monsieur James Clark, 46, Rue de Provence, Paris, on or about 10th February, 1916.

Coupons must be left four clear days for examination.

The Transfer Books will be closed from the 1st to the 7th January, 1916, both days inclusive.

By Order,
J. H. TILEY, Transfer Secretary.

Head Transfer Office,
Box 1040, Johannesburg,
22nd December, 1915.

THE SOUTH AFRICAN

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WITH WHICH IS INCORPORATED

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CONTENTS.

PAGE

Notes and News ... 407

Topics of the Week:

De Beers and the Diamond Outlook ... 409

Prospects of Southern Angola ... 410

The Native Labour Position ... 410

Position and Prospects of the Van Ryn Gold Mines ... 411

The Daggafontein Reconstruction Scheme ... 413

Position and Prospects of Messina Copper ... 414

The East Rand—II. ... 415

Transvaal Gold Mine Dividends ... 416

Diamond Company Meetings ... 417

Rhodesian Mineral Output for November ... 419

Correspondence and Discussion: "Royal Alfred Aged Merchant Seamen's Institution" ... 422

The Week in the Mining Material and Engineering Trades ... 423

The Week in the Sharemarket ... 425

African and European Investment Co. ... 426

Engineering Notes and News ... 430

Company Meetings: Luipaardsvlei Estate ... ii.

Notes and News.

Dividends for 1915. The absence of bonus declarations is mainly responsible for the drop in the total amount of the dividend distributions for 1915 as compared with 1914. The Rand gold mining dividends for last year total £7,617,561, as against £8,073,436 for 1914. It will be remembered that large bonus distributions by the Robinson and Ferreira Deep swelled the total for the former year. The feature of the 1915 declarations is the excellent showing made by Far East Rand companies, notably the Modder B., Brakpan, Modder Deep, Van Ryn Deep, New Modder, and Geduld. In the Central Rand the City Deep declaration is an outstanding feature, and the New Goch, Luipaardsvlei, Consolidated Langlaagte, and Langlaagte Estate are all bright and improved features. The chief disappointments in the list are the Crown Mines and the E.R.P.M., both having found the year exceptionally trying from the profit-earning point of view. The returns, for the whole Rand, must nevertheless be regarded as most satisfactory. Despite increased cost of supplies, special taxation, and other imposts due to the war, the industry is able to make a substantial division of profits that cannot fail, in the circumstances, to be highly gratifying to shareholders.

* * * *

Salts Industry. We regret to learn that the manufacture of Epsom Salts on the Rand, which afforded a means of using the excellent magnesite available in the Transvaal, but was in the first place of some importance as the beginning of a new industry, has somewhat abruptly come to an end. It is said that the quality of the Epsom Salts produced was quite up to the required standard, and that there was no difficulty worth mentioning as far as competition with the foreign product was concerned. The cause of the collapse of the undertaking seems to have been the limited demand of the South African market and the consequent pressure which dealers were able to put upon the producers in the matter of the selling price. As a side industry in connection with other manufactures of a similar kind, it is not unlikely that the making of Epsom Salts would be a successful undertaking, but by itself the enterprise seems to be too weak to hold its own as a profit-making process of any importance.

* * * *

Olifants Tin. A correspondent writes regarding the Olifants Tin Mine: "This property, which is a tributing company of the Transvaal Consolidated Lands, and situate on the farm Mutue Fides, Waterberg, is fast approaching the producing stage. The management wisely accumulated sufficient ore on the surface to keep a mill going for three years before erecting machinery. A battery, suction gas plant, pumps, etc., are, however, now nearing completion, and the work of crushing and producing will commence about the 1st February. Two of the directors, Messrs. E. Brayshaw and T. Kleinenberg, M.P.C., have just returned from the mine on a visit of inspection, and express themselves highly satisfied with the progress made in putting up the machinery and the prospects of the mine."

* * * *

Outside Districts. It is worth noting that the Pilgrims Rest district produced gold during the month of November to the value of £46,717, while the Barberton area yielded £24,540 worth, the number of mines in the first instance being 15, and 11 in the second. In addition to these plants, there were nine reef diggers, so-called, and 19 alluvial workers, whose contribution to the total amount was £2,500, or an average of nearly £100 per month for each person. The Cape continues to produce a small quantity of gold, while Natal has temporarily dropped out of the running. About 5½ ounces were recorded from the Cape Province, the yield being probably from the alluvial creeks of the Knysna, or possibly from the nuggety seams in the Prince Albert district. It may be mentioned that the small workers, such as alluvial diggers and reef workers with "dollies," referred to above, were nearly all registered in the Pilgrims Rest district, where some of these little concerns are doing remarkably well.

* * * *

Tin and Copper Returns.

The Mines Department returns for November show an unusually large increase in the tin production figures, the shipment of Transvaal concentrates having risen from 271 tons in October to 483 tons in the month under review, and the value thereof from £26,708 to £48,233. This does not indicate, unfortunately, that the tin production of the Transvaal has been augmented by any sort of permanent yield, but merely that it has been possible to ship material that has been accumulating for a little time. We believe the increase in the shipment alluded to is mainly due to an additional lot from the Leeuwpoort mine. Copper, during the year, has as usual been more susceptible to the same variations in shipment than tin, but, taking the yield all round, it is satisfactory to note that a substantial increase has apparently been recorded. The value of the Transvaal shipments of this metal last year was £320,327; the value this year will probably be over £400,000.

* * * *

National Diamonds.

Another chapter in the eventful history of the National Diamond Mine, formerly the Schuller Mine, has apparently been concluded. A somewhat mournful speech was made at the annual meeting of the company on Wednesday last, when Mr. J. H. Back, the chairman, explained that in spite of every effort the affairs of the concern, under the existing title, had practically come to an untimely end. He hinted at doings on the part of those who had contributed to the downfall which were of such a nature, he averred, that he could not tell the tale in an unvarnished and complete way without exposing himself to the penalty of libel. At the last moment, it appears, there was some hope that financial help would be forthcoming from people of some standing here, and we understand that the meeting was adjourned in order that a final effort might be made to secure this assistance. Probably, however, as Mr. Back remarked, these people would not be prepared to buy a law suit, and so the hoped for transaction was not effected. Mr. Back, who has been associated with the undertaking for a long time, and has been the central figure of more than one heated meeting of shareholders, shook the dust of the town from his feet last night, and left for England. It is said that Mr. Lageson, of the Transvaalsche Bank Buildings, has secured the option over the property. A reference to this matter was made in Mr. Back's speech. It is said that Mr. Wolff Carlis, who is an ex-director of the National Diamond Syndicate, is associated with Mr. Lageson in this new development of affairs.

* * * *

Electrolytic Precipitation.

Owing to the unsettled condition of the market, more particularly as regards zinc and aluminium, which are used now almost exclusively as precipitants in the cyanide process, the possibilities of electrolytic precipitation, which appears to be the most feasible substitute for the ordinary method, are receiving renewed and widespread attention. As far back as 1893 the Siemens-Halske process was introduced to the Rand with the object of dealing successfully with large volumes of weak solution which were not then satisfactorily treated by the ordinary zinc shaving method. Later on this defect was remedied, and electrolytic precipitation, which had not extended very far into Rand cyanide practice, was soon superseded by the improved zinc process. Since that date experiments have occasionally been made in the line of electrical metallurgy, but with no important outcome as far as practical work is concerned. Latterly, however, the advantages of electrolytic methods have again been prominently introduced to notice here, with, it is said, very satisfactory results, especially in the case of a process invented by Mr. U. C. Tainton, which has been tried for some time on a practical scale. In the list of patent applications his latest application is described as being for apparatus for the carrying out of the process described in patent 341/13, consisting of electrolytic cells in which the various members (anodes, cathodes, distance pieces, etc.), are combined in the form of a filter press. Another application for an allied electrolytic process is by Mr. R. A. Lehfeldt, stated to be an improved process for the recovery of zinc from solution, which consists in electrolyzing a solution of zinc with a cathode consisting of or containing mercury or liquid zinc amalgam. An interesting paper, by the way, on the subject of electrolytic precipitation from cyanide solutions, has recently been read by Mr. G. H. Clevenger at the 28th general meeting of the American Electrochemical Society in San Francisco, of which we hope to print an abstract in an early issue.

* * * *

Union Mineral Output.

The Mines Department returns for November show that the value of gold, silver, coal, and base minerals produced has been as follows:—Gold: Witwatersrand, £3,199,567; other Transvaal districts, £113,295; other Provinces, £23; total, £3,312,885. Silver, £8,932; coal, £188,809; base minerals, other than coal, £113,115; making a total value of £3,623,741. The totals for the eleven months from January, 1915, were, respectively:—Gold: Witwatersrand, £34,054,502; other Transvaal districts, £1,251,907; other Provinces, £10,104; total, £35,316,513. Silver, £97,342; coal, £1,942,338; base minerals, other than coal, £1,120,655; the total value being £38,476,848.

* * * *

Government Mining Revenues.

The statement of revenues collected by the Union Treasury during the period from 1st April to 30th November, 1915, includes the following items: Government ownership revenue: Diamond mines, £95 6s. 3d.; gold mines (bewaarplaatsen), £153,932 7s. 6d.; other mines, £12,009 12s. 7d.; licences and mynpacht dues, £165,411 19s. 8d. Taxes on mining: Diamond mines, £10,058 9s. 6d.; gold mines, £247,239 11s. 10d.; other mines, £10,267 1s. 2d. The amounts collected under the same heading for the corresponding period of 1914 being: Government ownership revenue: Diamond mines, £126,474 14s. 2d.; gold mines (bewaarplaatsen), £154,565 7s. 10d.; other mines, nil; licences and mynpacht dues, £173,246 8s. 1d. Taxes on mining: Diamond mines, £302,296 15s. 4d.; gold mines, £250,895 16s. 2d.; other mines, £15,523 10s. 11d. The total revenues from all sources, including an amount of £2,443,119 16s. 7d. under the heading of interest, and £137,797 17s. 5d. on loan recoveries account, was £10,121,289 13s. 7d., compared with £9,368,785 12s. 1d. during the same period of last year.

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Sheba.

The Sheba results for the twelve months ended June 30 were less satisfactory than in the previous period, this being due to a decline of 11s. 6d. per ton in the average grade of the ore treated. The decrease was partly countered by a reduction in working costs of 4s. 4d. per ton, to 19s. 2d. per ton. The amount charged for development was equal to 4s. 6d. per ton milled, or 1s. 6d. per ton below the previous year's figure. The outcome of the operations was a profit of £38,161, in comparison with £49,549. Two dividends of 5 per cent. each were paid, against three of like amount, and £10,028 was carried forward, or rather more than on the previous occasion. Ore reserves show little alteration at 100,100 tons. Development at Zwartzkopje, which produced 65 per cent. of the tonnage milled, was disappointing, the ore reserves declining during the period 19,300 tons, to 10,700 tons, this figure, however, showing that 36,111 tons were developed during the year. The prospects for the current year are less promising, and lower profits must be expected. As, however, the company owns a large mineralised area, further extensions of the ore body may be discovered.

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Johannesburg Gold Fields.

The report of the Johannesburg Gold Fields for the year to September 30 states that the gross revenue received from dividends and interest, rents, and transfer fees amounted to £3,226, a decrease of about £1,000 as compared with the previous year. This is almost entirely accounted for by the fact that the Cinderella Consolidated Gold Mines has, as recorded in the last report, been compelled to suspend payment of its debenture interest for a period which will expire one year after the signing of peace. The company's holding in Cinderella Consolidated debentures has, in consequence, been unproductive of interest during the whole of the financial year. The New Goch Gold Mines, however, in which the company has a shareholding, has re-entered the dividend-paying stage. Administration expenses in London, on the other hand, show a decrease as compared with the preceding year of £268, due to the voluntary surrender by the directors of half the fees to which they are entitled and to the reduction by £100 a year of the fee hitherto paid for rent and secretarial remuneration. These economies will be maintained during the war and until otherwise determined. The company's investments show an increase of £200 as compared with last year. A further decrease, however, of £6,067 has to be recorded in their valuation, as calculated from the Stock Exchange making-up prices at the end of the financial year. The directors regret that they have no information to convey to shareholders regarding the likelihood of any immediate resumption of work at the Cinderella Consolidated, in which the company is so largely interested. The advent of peace will have to be awaited before it will be possible to make the necessary financial arrangements for resuming operations at this mine.

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Stock Exchange Values.

The usual table of representative Stock Exchange securities appearing in the latest issue of *The Bankers' Magazine* shows an average appreciation in market value during November of 1·5 per cent., the biggest improvement registered in any previous month of the year, which has mainly been a record of declines. The valuation was made, however, just before the removal of minimum prices on Consols and certain other securities, or undoubtedly the rise would have been converted into a considerable decrease. In spite of this the advance may still fairly be accepted as reflecting the real situation as applied to the non-affected groups. The principal gains have occurred in the mining market, miscellaneous shares being 7·9 per cent., copper shares 5·9 per cent., and South Africans 5·1 per cent. to the good. Railways in British possessions are 4·7 per cent. and American rails 4·5 per cent. up. Among industrials shipping securities have risen 4·4 per cent. and telegraphs and telephones 2·3 per cent. Financial, land and investment shares are 4·1 per cent. and semi-foreign bank shares 2·8 per cent. better. The only decline of importance, probably on the new drinking regulations, is exhibited by brewery stocks, which have dropped 5·4 per cent., after pursuing an upward course for a considerable period

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Enemy Trading.

In the House of Commons last week, Mr. Peto again asked whether dividends on some South African mining companies were still paid on the stock to bearer, and deposited with certain banks in Switzerland, and what steps would be taken to ascertain that no dividends reached Germany. Mr. Steel Maitland replied that the general position was the same as stated in October 14 by Mr. Bonar Law, namely, no public trustee had been appointed by the Union, but the general policy of the Union Government regarding enemy trading was similar to that of Great Britain. Mining dividends payable to enemy subjects were being paid into the Union Treasury pending the conclusion of peace. Mr. Steel Maitland, replying on behalf of Mr. Bonar Law, also said information regarding legislation and executive action dealing with enemy trading was regularly communicated to other Governments of the Empire. He feared absolute uniformity was unobtainable. It must rest with the different Dominion Governments to decide how the general principles underlying the British policy should be applied. The Union Government quite recently introduced a Bill on the subject, but the full text had not yet been received. He saw no objection to communicating the text to the House when it was received.

TOPICS OF THE WEEK.

DE BEERS AND THE DIAMOND OUTLOOK.

For some reason or another, the De Beers Company, nowadays, always seems to be on the defensive, and at the annual meeting this week, the Chairman, Mr. Francis Oats, made one of his characteristic fighting speeches. In the first place, Mr. Oats justified the closing of the mines on the outbreak of the war. Anticipating that owing to hostilities the demand for diamonds would be stagnant for some time the company decided to close down and the correctness of this policy was evidenced by the fact that the company sold no diamonds for eleven months, from the commencement of the war until some time in June, 1915. The Chairman went on to state that in view of some slight increasing demand the company had decided to restart washing operations on a small scale on the 3rd of January, and in harmony with other producers in South Africa to maintain prices by producing only sufficient diamonds to meet this small demand. The Chairman also expressed the hope that if conditions continued as at present the company would be in a position to pay some dividend to preference shareholders at the end of June next. The Chairman proceeded to deal with other features of the financial position, showing that after providing for £375,000, expenditure in consequence of the war, a large proportion of which was distributed in making up to half pay the military pay of 1,315 employees who were an active service, and providing for other employees for whom work was found apart from actually producing diamonds; and after writing off depreciation of securities to the extent of £250,245 and setting aside £70,329 for the sinking fund for repayment of debentures there remained a loss on the year of £508,597, which was met out of the company reserves. Much of the Chairman's speech was devoted to a vindication of the loyalty of the company, which, we must confess, we have never seen seriously questioned. He gave a list of members of directors' families serving with the Imperial forces, and repudiated with scorn the suggestion that any of their directors had German sympathies. He produced a list of their investments in enemy securities made long before the war, which showed that these did not amount to 5 per cent. of the total of their investments, and this small amount had been greatly reduced by writing down. He emphasised the assistance they gave the Union Government in various ways during the rebellion and the war. No board ever existed that was more loyal to the British and South African Governments than theirs. With regard to the future of the diamond market, which, after all, is what the country is chiefly interested in, the Chairman said he did not think the world would take the same quantity of diamonds for some years to come, as in the past. He appealed for co-operation, especially on the river, to see that more diamonds were not placed on the market than could be absorbed at the present or even at an enhanced price. He saw no reason why the price should not be raised still higher, inasmuch as they would have less to expend in producing a smaller quantity of diamonds. They would make a little more profit with which they hoped to recoup their shareholders. He was inclined to think if things went on as at present that they would have some money at the end of June to pay some dividend to their preference shareholders, but he would make no promise. Since the end of the financial year they had sold some few diamonds and the surplus of money they did not require for day-to-day requirements they had subscribed to the British War Loan. They had even subscribed a little to the French War Loan. Mr. Oats added that they would begin to work next week with a couple of machines, the workers receiving full pay. If their sellers told them they could sell a little more then they would enlarge the scale of their operations. They could not expect to return to the old conditions for a long time. We understand that a similar decision has been come to by the directors of the New Jagersfontein and the Premier Companies, and that washing at all properties will be confined to ground now weathering on the surface. At the Premier, particularly, mining has to be conducted on a large scale or not at all, and it will be some time before operations of that nature can be re-started. River diggers especially will welcome Mr. Oats' remarks; and though it is not yet quite clear whom or what causes we have to thank for the partial resumption of washing operations, we must be grateful for the unexpected measure of activity in the industry that has followed Mr. Joel's visit.

PROSPECTS OF SOUTHERN ANGOLA.

Mr. Vice-Consul G. B. Beak, in his report for the year 1914 on the trade and agriculture of Southern Angola, which has just made its appearance, pays a glowing tribute to the prospects of that country. In an extended reference to the Benguella Railway this official, who writes a very valuable document, remarks that this great trunk line starts from the coast at Lobito Bay, and in Lobito Bay, 4,930 miles from Southampton, Southern Angola possesses by far the finest port on the West Coast of Africa and probably one of the best harbours in the world. The natural advantages it possesses are a guarantee for its increasing prosperity and the leading place it is destined to take among the ports of the sub-continent. From London to Kambove, as the future centre of the Katanga mining industry, the distance via Lobito is 6,457 miles, or 2,000 miles less than by the existing four routes. The Benguella route is direct, and since November, 1913, 315 miles have been opened to traffic. Earthworks are constructed for another 50 miles. It may be mentioned that the Tanganyika Concessions owns 90 per cent. of the capital of the railway company. Mr. Beak points out that on the section open to traffic—Lobito to Chinguar, 315 miles—the revenue exceeds the working expenses, thus:—1910, receipts £62,256, working expenses £77,088; 1911, receipts £84,699, working expenses £66,529; 1912, receipts £93,900, working expenses £70,600; 1913, receipts £90,587, working expenses £62,915; 1914, receipts £76,362, working expenses £60,555. This he attributes to the fact that the railway has rendered possible the development of a hinterland which was previously practically inaccessible from the coast. Mr. Beak says that from both an agricultural and commercial standpoint the general impression that Southern Angola is one of the richest districts in Africa is undoubtedly justified, and he proceeds to indicate avenues of trade that might profitably be entered by trading firms. One special point in the report that deserves all the prominence that can be given it is contained under the heading "A Note of Warning." It confirms Mr. Williams in his determination to defer the question of the provision of capital until he can resume touch with his principal Belgian partners, at present shut off in Brussels. When it is remembered that financiers from Germany were keen on finding funds, the full significance of the "Note of Warning" becomes apparent. A German traveller, says Mr. Beak, who returned from Southern Angola to Europe in June, 1914, and whose impressions of the country appeared in the *Cologne Gazette*, thus summed up German prospects in this portion of the colony: "The game is worth the candle! An enormous market for industrial products, rich and virgin mineral treasures, a fruitful and healthy country, equally suitable for agriculture, cattle-breeding, and immigration, and the finest harbour on the West Coast—that is the prize that awaits us." As to what "the game" was everyone can now make a pretty shrewd guess. But by his foresight Mr. Williams saved the situation, financially at least, where the Benguella Railway is concerned. Add to this another remark by Mr. Beak, and some idea of the prospects of the line can be gathered: "The effect of this railway on the economic development of the centre of the continent may be compared with that of the Canadian Pacific on the development of Western Canada, or of the Trans-Andine Railroad in South America."

THE NATIVE LABOUR POSITION.

In commenting upon the excellent position of the Rand mining industry, as disclosed in the speech of the President of the Chamber of Mines last week, hardly sufficient emphasis was laid upon the important factor of improved native labour supply. The strong native labour position, of course, is mainly responsible for the improvement on the mines during the year just closed. At the last meeting of the Native Recruiting Corporation, it will be remembered, the chairman drew attention to the gratifying manner in which the number of natives recruited by the corporation had been increased. In the year to June 30, 94,295 natives were recruited, an average of 7,858 per month, against 60,092 and 5,008 in the preceding twelve months. At the end of June the general average percentage of underground complement employed by the mines was 78·7 per cent., against 70·55 per cent. a year previously. That percentage had continued to increase, and at the end of September stood at practically 90 per cent. That unique position he described as due to a combination of circumstances, in which the absence of industrial unrest, poor seasons in native territories, and, to a lesser extent, the war and the consequent closure of the diamond mines, all formed part. Since that speech was made the position has further improved; and the figures given by Mr. Dawe last week are unique in the history of the industry. He showed that at the end of August last the number of natives in the employ of members, excluding those in the Barberton-Breyten, Rooiberg and Orange Free State districts, reached a total of 206,809; at the end of November this figure had risen to 219,500, of which 210,068 were employed on the gold mines. The increase, therefore, for the gold mining companies for that period amounts to 13,202 natives, and the total number employed by these companies is equal to 94 per cent. of their total fixed complements, compared with 73·4 per cent. at this time last year. Regarding wastage, namely, boys taking their discharges from the gold mines, the figures show that during the quarter ended November 30 this year 55,193 took their discharges, as compared with 49,583 for a similar period last year. The recruiting figures for the quarter show a general increase, compared with the same period in 1914, namely, 13,956 natives from the East Coast, compared with 11,716; 32,714 natives from the Union territories, compared with 25,981, whilst the natives offering their services locally or paying their own fares to the Rand total 23,121, as compared with 13,123. The total figures for the quarter show that 69,791 natives were engaged, as compared with 50,820 for the same period of last year. The fact of such a large increase in the number of voluntary natives was welcomed by the President of the Chamber as particularly interesting and satisfactory. He added: "The outlook in regard to the supply of native labourers from the Union territories appears, so far as can be foreseen, to be favourable. With the partial opening of the diamond mines, and the possibility of a better harvest in 1916 than was reaped in 1915, it is to be expected that the number of labourers coming forward during 1916, especially during the latter half of the year, will not be quite so great as during the present year. The indications, however, are that the supply will be sufficient for all requirements so far as the mines are concerned." This clear, unequivocal statement should confound the cynics who are wont to declare that the spokesman of the industry can never afford to release the native labour factor from the position of whipping boy for all the shortcomings of the mines. It is, perhaps, the most direct and satisfactory authoritative statement on the subject of native labour made for years; and it opens up an interesting field for discussion in regard to the part played in securing so excellent a position by, on the one hand, the efforts of the Recruiting Corporation and, on the other, by the amelioration of native working conditions on the Rand.

POSITION AND PROSPECTS OF THE VAN RYN GOLD MINES.

Points from the Annual Reports of Directors and the Managing Director.

The net profit realised by the Van Ryn during the year ended June 30, 1915, amounted to £262,143 14s. 7d. The balance brought forward from the previous year was £16,165 2s. 3d.; making a total available profit of £278,308 16s. 10d. This has been appropriated as follows:—For payment ol dividend No. 22, £112,500; dividend No. 23, £112,500; taxes, £23,276 11s. 6d.; Union Government war levy (first moiety), £5,706 19s.; sundries, as per appropriation account, £8,825 19s. 6d.; leaving a balance to be carried forward to the current year of £15,499 6s. 10d. The mill ran 332·6 days, and with accessory tube mills crushed 462,920 tons of ore, yielding 137,815·576 ozs. of fine gold, of the value of £579,996 8s. 5d.. or at the rate of £1 5s. 0·698d. per ton. Working expenditure amounted to £344,298 12s., or 14s. 10·501d. per ton milled, resulting in a profit of £235,697 16s. 5d., equal to 10s. 2·197d. per ton. The directors' report points out that this result does not differ materially from that of the preceding year. While the ore treated has been greater in quantity by 23,020 tons, it has been of a slightly lower grade (25s. per ton as compared with 26s. 10d. for last year.) Working expenditure on the other hand has been reduced from approximately 16s. for last year to 14s. 10d. per ton for the current year, thus showing a net reduction of 8d. per ton. The manager's estimate of the ore reserves at the close of the financial year under review is as follows:—Fully developed—1,953,000 tons of an average value of 6·20 dwts. over 51 inches; partially developed—18,000 tons of an average value of 9·9 dwts. over 40 inches. In compiling the above estimates all ore of a value below 4·3 dwts., of which 1,121,000 tons have been either fully or partially developed, has been excluded and for the time being classified as unpayable. It is quite possible that a substantial portion of this tonnage will eventually prove capable of profitable handling. The position as regards payable tonnage fully developed remains practically the same as that at the end of last year, a small decrease in quantity and a reduction of ·29 dwt. per ton in value being recorded. In accordance with custom no credit appears in the balance sheet for these reserves, the cost of which has been met out of past profits. Except for an outlay of approximately £450, incurred in the fencing of our property, the expenditure on capital account has been confined to certain additions to our plant and machinery, of which the more important is the installation, in conformity with Government regulations, of two new dump spraying plants. The total expenditure, amounting to, roughly, £2,500, has been provided out of current revenue. It is satisfactory to record that the position of our water supply shows a marked improvement compared with that of a year ago. In the meantime copious rains have fallen, with the result that both dams on the company's property were filled to their utmost capacity, and a full supply of non-potable water is assured for some time to come from the Company's own sources. The year's revenue has admitted of the declaration of the following dividends, which were paid on the dates set opposite each respectively, viz.:—No. 22, of 22½ per cent. (less tax), 11th January, 1915; No. 23, of 22½ per cent. (less tax), 15th July, 1915; making, together, 45 per cent., or 9s. per share for the year. A detailed list of the dividends, amounting to £2,144,500, paid since the incorporation of the company, is attached to this report. The directors have participated on behalf of the company in the subscription of 3½ per cent. Government War Loan Stock to the amount of £100,000.

Managing Director's Report.

Sir George Albu, the managing director, writes:—I beg to submit my report on the operations of your company for the financial year ended 30th June, 1915. Gold production: During the year an average of 140 stamps ran for 332·60 days, and with tube mills crushed 462,920 tons of ore, yielding 137,815·576 ozs. of gold of the total value of £579,996 8s. 5d., representing a recovery of £1 5s. 0·698d. per ton. Working costs (including administration expenditure in Johannesburg and London) amounted to £344,298 12s., equal to 14s. 10·501d. per ton, leaving a working profit for the year of £235,697 16s. 5d., or 10s. 2·197d. per ton. As compared with the previous financial year, these figures reflect an increase of 23,020 tons crushed, and a decrease of 1,431·212 ozs. in the gold won, equivalent to £10,132 8s. 10d. in value. This diminution in the total yield is due to the lower average grade of the ore milled during the period under review, which gave a recovery of £1 5s. 0·698d. per ton, as against £1 6s. 9·96d. for the year ended 30th June, 1914. On the other hand, working costs show a reduction from 15s. 11·576d. per ton for the previous financial year, to 14s. 10·501d. for the past year, the net result being that the working profit for the latter period is slightly less than that for the preceding year. Mine development and ore reserves: 9,344 ft. were driven, risen and sunk on development work during the past year, as compared with 8,691 ft. for the twelve months ended 30th June, 1914. The ore reserves have been maintained at approximately the same figure as shown in the previous report (1,953,000 tons of fully developed payable ore at 30th June, 1915, as against 1,973,000 tons at 30th June, 1914), but the average value reflects a slight drop from 6·49 dwts. to 6·20 dwts. per ton. There were also 18,000 tons of ore partially developed, of an average value of 9·9 dwts. per ton, calculated over an estimated width of 40 ins. These figures are arrived at after using the same factor of limit of payability as on previous occasions, *i.e.*, 4·3 dwts. per ton; all blocks below this value have, for the time being, been classified as unpayable, although it is probable that a substantial portion of the 1,121,000 tons of developed ore contained in these blocks will eventually be stoped with profitable results. I desire to draw your attention to the details given in the manager's report (appended hereto) under the heading of "Mining," which show the unusually large number of reef bodies in your mine laid under contribution for supplying ore to the mill. Capital expenditure: The outlays under this head for the past year are comparatively insignificant. The chief item of expenditure is in connection with dump spraying plant, which is being installed generally on the mines along the reef with a view to abating the dust nuisance so much in evidence on windy days. The dumps are periodically treated with a liquid preparation to prevent as much as possible the fine sands being blown over the surrounding country. It will be noticed that expenditure has also been incurred in fencing the 6,770 acres comprising the deproclaimed portion of your company's farm. Prior to the deproclamation in 1913, we had no means of preventing any person or persons from squatting or grazing their cattle on the farm, but one effect of the deproclamation has been to re-invest your company, as freehold owner, in the surface of the ground. Judging from expert advice which I have obtained, the farm is for the most part probably not adaptable for agricultural operations on a large scale, but it may prove quite suitable for cattle raising and other similar objects. In any event, however, the fencing will enable us to exercise a better supervision over this portion of the property of your company. General: The native labour supply has been satisfactory during the whole of the year under review, and the position has been fully maintained from the 30th June last up to the present time. In fact, the number of boys now being employed on the mines is probably greater than at any time in the history of these fields, with the consequence that, with very few exceptions, the gold mining companies of the Rand at present possess their full requirements of this class of labour. In my report for the previous financial year I I referred to the success which had attended the sinking of boreholes on your property for the purpose of obtaining an additional and economical source of supply of water. Fortunately, we experienced an abnormally heavy rainfall during the past season, with the result that both the dams on the mine were filled, and consequently, as pointed out by your manager, we have since been able to obtain all our non-potable water requirements from our own supplies. I may add that for the last few months we have taken no water at all from the Rand Water Board, as such potable water as is necessary for domestic and health purposes is now being obtained from our boreholes. The effect of the European War and the recent campaign in South-West Africa upon the expenditure of your company has been and still is a considerable factor. Apart from such items of direct outlay as the company's *pro rata* proportion of the Chamber of Mines' donation of £30,000 for a hospital ship, the salaries and wages paid out monthly to the dependents of employees away on active service, and the Union Government levy of £500,000 on the gold mining industry, the increased price of essential stores consequent on the higher cost of production in Europe and the heavier charges for freight, insurance and war risks amounts at the present time in the instance of your company to over £800 per month. Under these circumstances the existing level of working costs may be regarded as distinctly satisfactory. Preparations are now in process for commencing the reclamation of the pillars which have from time to time been left in the upper workings of the mine. Having regard to the exceptional number of reef bodies under tribute for mining operations in the case of your property (to which I have previously referred in this report), methods of stoping have necessarily had to be adopted calling for the leaving of an unusually large quantity of pillars as compared with other mines, and consequently a very considerable tonnage from this source can be confidently anticipated. The grade of the ore to be obtained in this respect should exceed that of existing or prospective ore reserves.

Balkis, Ltd.

The balance sheet of the Balkis Company as at August 31 shows that, "at or under cost price," sundry investments stand at £32,210. Short loan and sundry debtors figure for £3,524. These two sums, amounting to £35,734, have produced, together with rents, an income of £1,421, or something less than 4 per cent. Against the total income of £1,434 were expenses amounting to £1,670. Nothing is said about depreciation. The excess of cash and cash assets over liabilities is £2,184, and there is a contingent liability on shares and stock held of £5,394. The company's land asset, consisting of about 306,000 acres, is taken into the accounts at £73,719, or, say, 4s. 9d. per acre.

Wolhuter Gold Mines.

The manager's report on the operations of the Wolhuter for the quarter ended October 31, 1915, shows that from 120 stamps, 4 tube mills, and cyanide works, with 106,300 tons milled, the total revenue was £129,446 16s. 4d., or 24s. 4·260d. per ton milled; the total working costs being £87,832 5s. 9d., or 16s. 6·304d. per ton milled; and the profit for the quarter being £41,614 10s. 7d., or 7s. 9·956d. per ton milled. On the 13th October dividend No. 16 of 6¼ per cent. (1s. 3d. per share) was declared for the six months ended 31st October, payable to shareholders registered on 31st October. Capital expenditure totalled £2.725 13s. 4d. There were recovered from all sources 31.096·308 ozs., equal to 5·851 dwts. fine gold per ton milled. The footage developed totalled 3,463 feet, and the footage sampled was 2,875 feet, giving an average width of 29·6 inches and an average reef value of 9·3 dwts., the average stope width being 54·6 inches, and the average stope value 5·0 dwts. The tons developed or exposed during the quarter, including ore mined from development, showed an estimated payable tonnage of 124,519 tons, assaying 7·02 dwts. over 52·4 inches, and an estimated unpayable tonnage of 31,093 tons, assaying 2·97 dwts. over 50·9 inches. The ore reserves are being recalculated and will be shown in the annual report. The machinery and plant continue in good working order.

Glynn's Lydenburg.

The directors' report of the Glynn's Lydenburg for the three months ended 31st October, 1915, shows a revenue of £19,977, equal to 32s. 5·8d. per ton milled, and a working profit for the quarter of £7,218, equal to 11s. 8·8d. per ton milled. The interim appropriation account shows a balance brought forward from 31st July of £28,812, a balance of working expenditure and revenue account of £7,025, and a balance of £32,900 carried to the balance sheet. The net capital expenditure for the quarter amounted to £2.052 0s. 10d. The amount unexpended on authorised votes at 31st October was £1.691. Development on Mill Hill, South Hill and Werf Mijnpacht amounted to 1,716 feet driven, 773 feet risen and sunk, giving a payable total of 614 feet of an average width of 9·5 inches and an average value of 10·6 dwts. The comparative low footage exposing reef as compared with the total number of feet driven is due to the undulating character of the reef, which at times passes into the hanging wall and at others into the footwall. The total yield for the quarter was 4,767·110 fine ozs., giving a total yield per ton of 7·752 dwts. *Werf Mynpacht.*—During the quarter good progress has been made in this section of the mine, 1,423 feet having been driven in undeveloped ground. Work will continue to be pushed ahead here as rapidly as possible. Although water is still plentiful in this section, it is now well under control. *South Hill.*—Work has been continued here on a very small scale, but without anything encouraging being found. *Sabie Weir.*—This work has been taken out of the hands of the contractor and is now being done by the company. This has resulted in much more rapid progress being made than was formerly the case.

S.W. Transvaal Diamond Diggings.

RETURNS FOR NOVEMBER.

The returns of diamonds found during the month of November in the various localities of digging operations throughout the South-Western Transvaal show a total value of £13,819 19s. 6d., which is somewhat less than in October, but ahead of any other month of this year, whose monthly returns to date have been:—

	Carats.	Value.		
January	1,065¼	£2,593	5	6
February	1,607¾	4,273	11	6
March	2,066½	6,325	9	6
April	2,595	10,181	1	6
May	2,173	9,389	4	0
June	2,092¾	9,402	13	6
July	2,292	8,984	8	0
August	2,803¾	10,543	19	0
September	3,343½	13,191	5	6
October	3,750¼	14,454	15	6
November	2,918½	13,819	19	6

Forty-one areas figured in last month's list, the more important being Bloemhof, 601 carats, value £2,322 5s.; London, 449¾ carats, value £2,217 16s. 6d.; Dievedraai, 307¼ carats, value £1,962; Kameelkuil, 145¾ carats, value £774; Kaffirspan, 186¼ carats, value £728 7s. 6d.; Cawood's Hope, 139½ carats, value £597 18s. 6d.; Mooifontein, 131 carats, value £624. Among the stones specially mentioned in the returns were the following: At Bloemhof, four aggregating 62 carats, value £310 5s.; at London, eight aggregating 496 carats, value £426; at Dievedraai, eight aggregating 114½ carats, value £778; at Mooifontein, one of 12½ carats, value £155; at Goedehoop, three aggregating 44 carats, value £371 10s.; at Mamusa, one of 12½ carats, value £150; at Koppiesvlei, two aggregating 39¾ carats, value £118; at Klipkuil, three aggregating 46½ carats, value £224; at Diamant, O.F.S., two aggregating 26 carats, value £200; at Schweizer-Reneke, two aggregating 28¾ carats, value £200; at Kareepan 137, one of 11 carats, value £40; and at Katdoornkraal, one of 11 carats, value £74. The diamonds found on the farm Killarney, in the district of Taungs, during the month of November, amounted to 85 carats, valued at £346 15s.

THE DAGGAFONTEIN RECONSTRUCTION SCHEME.

Brief History of the Property—Original Capital Resources Exhausted—Outline of Proposed New Scheme.

Judging from the mail papers to hand, a great deal of interest has been taken lately in the progress of the Far East Rand, and the new Daggafontein scheme of reconstruction has naturally attracted an exceptional amount of attention. Initially the freehold of farm Daggafontein, in the Far Eastern Rand, was owned by what now is the Henderson's Transvaal Estates, Ltd. The farm comprises 4,363 morgen, which is equal to 9,238 acres, and again equivalent to 6,285 mining claims. In June, 1899, the Daggafontein Prospecting Syndicate, Ltd., was formed with an authorised capital of £60,000 to prospect by boreholes the potentialities of the property, and the right was given the syndicate to form a mining proposition with a capital of £600,000. A commencement of boring by the syndicate was made, but owing to the Boer War for a long period nothing could be effected. After that war boring was recommenced and conducted by the syndicate up to the time of the formation of the Daggafontein Gold Mining Company, Ltd., in October, 1902, and from September, 1903, the mining company conducted its own operations. Boring at various points in Daggafontein has proved the existence not only of the Main Reef (Van Ryn) series, common to the whole of this region, but also, about 1,300 feet nearer to surface, parallel reef formation, termed the Kimberley Reef, and in two of the bores that were sunk in farm Daggafontein assays of Kimberley Reef were found of payable character. In the middle of September, 1914, the shaft met reef at about 3,580 feet depth, reported to show an assay value of 7·85 dwts., say 33s. 4d., over a width of 40·36 inches.

Capital Allocation.

The Henderson's Transvaal Estates, Ltd., as vendor, on the formation of the Daggafontein Gold Mining Company with £600,000 capital, received as its consideration 300,000 £1 shares, and the Daggafontein Prospecting Syndicate had the right to take at par the balance of the £600,000 capital. On the formation of the Daggafontein Gold Mining Company in October, 1902, the syndicate subscribed at par for 100,000 shares, and, under option rights which it is unnecessary to detail here, in 1904 it took up a further 10,000 shares at par. The detail of issues of capital by the Daggafontein Gold Mining Company are given below:—

October, 1902. Capital £600,000 in £1 shares.

	Shares.
To vendors (Henderson's Transvaal Estates, Ltd.)	300,000
October, 1902: Purchased by Daggafontein Prospecting Syndicate	100,000
Further issue to directors, etc.	1,507
April, 1904: Taken under option by the Daggafontein Prospecting Syndicate at par	10,000
April, 1909: Purchased by Henderson's Transvaal Estates at par	125,000
Total issue to present date	536,507

The majority of the Prospecting Syndicate's £60,000 capital is believed to be held by Henderson's. The reimbursement of the syndicate of the costs of sinking boreholes, and the cost of the company's own boring operations, later loss on investments, the company having temporarily invested working capital resources in Consols and lost money thereby, and finally the expenditure of about £250,000 for cost of shaft sinking and its equipment left the company in the position at June 30, 1914, of having expended all its working capital resources, and incurred a floating debt of some £107,000. At the present time, we understand, the floating debt is approximately £130,000. Throughout its recent history the company has been financed by the Henderson's Transvaal Estates, Ltd. When the war broke out in August, 1914, all operations were suspended and the mine put in charge of a caretaker. Any idea of raising further capital during the war period has been hitherto deferred, but for some months past there have been rumours of negotiations with design to lift the Daggafontein out of its present impecunious and uncomfortable position. These rumours have taken a more definite shape during the last few days; and, indeed, it is now no secret that arrangements have been made between the Consolidated Mines Selection, the Central Mining and Investment, and the Henderson's Transvaal Estates, Ltd. Heretofore the last-named company alone has provided the financial resources required. The Daggafontein mine has been somewhat of the nature of a millstone about the neck of the Henderson's, and it may be fairly said the proposition is too big a one for it to undertake single-handed. But it is quite a different matter when the co-operation is secured of the Consolidated Mines Selection and the Central Mining, two strong companies. A reconstruction and putting up of additional capital does not mean the Daggafontein will then and there enter a state of prosperity, remarks *The Statist*. There will have to be a long period of waiting—to effect developments, the sinking of a second shaft, and later, if the nature of developments permit, the erection of a reduction plant. This will take two or three years.

The Scheme Proposed.

Although the main details of the contemplated Daggafontein reconstruction have been agreed upon by the Henderson's Transvaal Estates, Ltd., who are by far the largest shareholders and practically control the concern, the matter has yet to be placed before the directors of the Daggafontein Company itself. The idea entertained was to form a *new* Daggafontein Company to take over the property against the issue of approximately 308,000 £1 shares, 130,000 of which would be issued to Henderson's Transvaal Estates, Ltd., in discharge of the Daggafontein Company's debt to that corporation, being at the rate of one share for every £1 owing. The balance would allow of a distribution of one new share for every three of the 536,507 existing old £1 shares. Then, beyond, 100,000 shares would be subscribed at par by the Consolidated Mines Selection Company, Ltd., the Central Mining and Investment Corporation, Ltd., and Henderson's Transvaal Estates, Ltd. This money is intended to be employed in the immediate prosecution of development operations. The position would then be:—

	New £1 Shares.
To old shareholders, say	178,000
To retire floating debt	130,000
Subscribed at par	100,000
Total	408,000

It is contemplated that at a later date convertible debentures to the tune of £400,000 will be created, and will be offered to the shareholders of the Daggafontein Company under a guarantee of the above corporations, who, as a consideration for such guarantee, will receive further options and a cash commission. It is understood that the management and engineering control of the reconstructed concern will be vested in the Consolidated Mines Selection Company, Ltd.

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POSITION AND PROSPECTS OF MESSINA COPPER.

The Question of Ore Reserves—An Advance in Metallurgical Methods.

The annual ordinary general meeting of the Messina (Transvaal) Development Company, Ltd., was held on the 25th November at Salisbury House, London, E.C., Mr. H. C. Hoover presiding.

The Secretary (Mr. A. A. Kelsey, F.C.I.S.) read the notice and also the auditors' report.

The Chairman stated that Mr. Leslie, the chairman of the company, was unable to be present owing to indisposition, but had prepared the speech which he would have delivered had he been present. In the course of his speech Mr. Leslie said that the shareholders were meeting under far more favourable circumstances than the most optimistic of them could have anticipated when they met a year ago. On 30th June, 1914, the current liabilities of the company exceeded the liquid assets by about £75.000, whereas on 30th June, 1915, the liquid assets exceeded the current liabilities by about £31,000. They had been able to clean up the balance sheet by writing down dead assets, and there was not much now left to do in this respect. With regard to the various security assets, they had to face the fact that present conditions were unfavourable to the realisation of such assets and also to their value. So far as the loan against the debentures of the Canadian Agency was concerned, there was a claim by the liquidator that that company's debenture stock was invalid, and the issue would probably be tried in the Courts during the present term. The amount of money collected up to the present time by the receiver was in the neighbourhood of £23,000, and, according to the receiver's estimate, there was quite a reasonable probability that another £15,000 to £20,000 was capable of collection in due course. On the other hand, although £500,000 of the debenture stock was issued, the large majority of debenture stockholders had already consented to waive their claim to any participation as debenture stockholders in the assets collected by the receiver. If this company's charge should be declared valid, they would be able to recover a considerable sum of money. As to the present position of the Messina Company, the overdraft at their London bankers, which at the end of 1914 amounted to about £85,000, had been reduced to £27,000 at the date of the present balance sheet. It had since been paid off, and they now had a credit balance there of about £49,000. They had also a quite considerable credit balance in South Africa on current account, the only money now owing in South Africa being the advances made from time to time on products in transit, which was repaid out of the first realisations of this metal as it came forward.

THE MINING POSITION.

As to the position of the mine itself, there was some difference of opinion as to the position and value of the ore reserves, and Mr. Kuehn was sent out to check the matter. Mr. Leslie said that he was somewhat disappointed with Mr. Kuehn's estimates, and that, in his view, was the weak point of an otherwise magnificent position. They had to remember, however, that Mr. Kuehn was like everyone else. He did his best to avoid overstating his case, and, whether he understated or overstated it, the fact remained that they could not get more out of the mine than there was in it. In consequence of this position, they were taking energetic steps, now that the financial position admitted of this policy, to develop the mine itself and some adjacent prospects on the property. It was too early to speak of results at present, but the prospects were quite promising, and they had great hopes of improving the position of the ore reserves by these means, because Mr. Kuehn had not in his estimate of the reserves included any tonnage for increase in depth or laterally, or for surface prospects. They know of no reason why the mine should not go down to much greater depths than they had yet reached. In fact, it was all in favour of continuity in depth that the quality of the ore in the ninth and tenth levels had not changed and that the same rich bands of bornite and chalcopyrite appeared to make up the ore in the pay shoots. It seemed probable, however, that in such a mine as this, where rich and poor ore lay close together in relatively small shoots, there would come out of the mine more than any estimate of the actual ore reserves might show. It was true that the two principal ore bodies, the Bonanza hanging wall and footwall, showed a noticeable decrease in size, but this phenomena of decreased width had happened in some of the higher levels and might happen again; and they did not attach great importance to it for the next 200 feet or 300 feet. It led them, however, to suppose that the present rate of output might not be indefinitely maintained; but, as they were deliberately pressing the mine output in view of the present price of copper, they must not complain or be disappointed if they had, say, in about twelve months' time, to be content with a lower output than they were now getting. It was obvious that their experts could not control the amount of ore which existed in this or any other mine, and this axiom brought him to his next point, which was perhaps the most important one affecting the company.

IMPROVED METALLURGICAL METHODS.

Although the quantity and assay value of ore existing could not be controlled, it was possible, by utilising the latest experience of successful metallurgists, to control to a great extent the recovery of copper from that ore, and by various means to increase the amount of ore which could be handled at the mill in any given period. Mr. Emery went out to Messina in August and formally took up his position as general manager in December of last year, and he had succeeded in effecting the following improvements: he had increased the sorting and milling capacity of the plant from 20 per cent. to 25 per cent., so that it could now handle 10,000 tons a month. This enabled them to press the mine output at a time when copper prices were favourable. He was, they believed, well on his way towards getting an extraction of 90 per cent. of copper from that ore, as compared with an extraction of 74 per cent. obtained in December last. This increased extraction, moreover, had been obtained from a lower grade ore than was available in December last, and, calculated on an annual output of 5,000 tons of copper, was equivalent to an additional profit for the company, at present prices, of something approaching £60.000 per annum, as compared with their former milling practice. In other words, assuming they were sending to the sorting and milling plant 90,000 tons of ore per annum, of the assay value of 7 per cent. in copper, this would give the total copper contents as 6.300 tons. On the basis of 71 per cent. extraction of copper they should obtain 4,662 tons of copper to market, whereas on the basis of 90 per cent. extraction the amount of copper recovered would be 5,670 tons, or an additional 1,000 tons. This 1,000 tons would be obtained practically free of cost, except for the extra freight and realisation charges involved. On the basis of the present prices and output they were, therefore, obtaining a further £60,000 a year of net revenue for an expenditure on plant and machinery of not exceeding £5,000. It would be gathered that the perspective of the whole proposition had changed since last year. Owing to improved metallurgical methods, they were obtaining more copper from the same amount of ore and, owing to decreased ore reserves, additional capital expenditure must be curtailed to its smallest possible dimensions. The question, therefore, of erecting a smelter had vanished. The only policy really before them was that of spending all the money they could proportionately expend on the development of the property with a view to increasing the ore reserves, and this they were now doing by every means in their power. The cost of alterations and additions to the mill and sorting plant by which this change had been effected had not exceeded £5,000. Referring to the arrangements made with the Interguarantee Syndicate with regard to the guarantee which the company's bankers required for the large overdraft which they provisionally agreed to make, Mr. Leslie stated that about the middle of September last it became evident that the finances of the company were on a more assured basis, and that the continuation of the guarantee was unnecessary. On being approached, the syndicate at once agreed to cancel the obligation on both sides as from 30th September last. The result had been that this guarantee, which had extended over 15 months, had cost the Messina Company about £1,500, and that the company now controlled the whole of its unissued shares.

EXCESS PROFITS TAX.

Referring to the excess profits tax, he pointed out that, in the course of a debate in the House of Commons. Mr. McKenna had been asked whether the rate of interest allowed would include some provision for wasting security, and he replied as follows: "Of course it would. For instance, I had a case brought to me of a gold mine which from start to finish had only five years' life. Given such a mine, which has only just begun to pay for the first time this year, a 6 per cent. return on the capital would be absurd. It would not even pay the interest. They had to repay the whole of the capital in five years. It is a case that ought to go to the referees. The referees are a business body well qualified to judge of these points, and will take a fair view of what the allowance ought to be." It seemed quite clear, Mr. Leslie said, that the Messina Company came under the same category as that gold mine. Shareholders had had no return on their investment during the nine years of the company's existence, so that it followed that shareholders had to get back nine years' interest on their investment and also their capital representing that investment out of the mine, which was a wasting asset, before they could be said to earn any profit at all. It was evident that they would have to go before the referee, but he was unable to say, otherwise than he had just indicated, what view the referee would take of the circumstances in which they were situated. There were some points about the future which they had to keep steadily in mind, such as the taxation question, the contingent liability under the railway guarantee to the South African Government, the redemption of debentures, which commenced next year, and the current financial requirements of the company under present uncertain conditions. The question of dividend must be subservient to all these considerations. They were hopeful, however, that in the early part of next year it would be possible to declare an interim dividend, should no unforeseen change in the position take place. The Chairman added that the remarks of Mr. Leslie expressed the views of the entire board, and he concluded by moving the adoption of the report and accounts.

Mr. R. J. Frecheville seconded the motion, which was carried unanimously.

The retiring directors and auditors were re-appointed, and a vote of thanks to the chairman and directors closed the proceedings.

WRIGHT'S ROPES.

THE EAST RAND.—II.

Some Unjustifiable Correlations—The Identity of the Van Ryn and Nigel Reefs—A Chance for Optimist and Pessimist.

[From Dr. E. T. Mellor.]

The danger of making hasty conclusions with regard to the outcrops which appear in rare and scattered inliers are emphasised in the following remarks:—

> To pass now to the consideration of the Upper Witwatersrand System, we find that eastwards from Boksburg the practically continuous outcrops of the nearer East Rand cease to be available. The country is extensively covered by later formations and the Upper Witwatersrand rocks are only occasionally seen in widely separated inliers. Some of these are of considerable interest for the evidence they give of the general trend of the Witwatersrand System beneath the later rocks. Thus the Elsburg reefs and the line of junction of the Klipriversberg amygdaloid with the top of the Witwatersrand System are exposed in a small inlier on the western portion of the farm Witpoort, to the south of the Van Dyk mine. The continuation of the same line of junction is also seen on a more extensive scale about two miles further east. A small inlier in the south-eastern corner of Rietfontein to the south of the Apex Mines contains outcrops of beds probably not far from the horizon of the Bird reefs, including a small exposure of amygdaloid diabase perhaps assignable to the "Bird Reef Marker." The various outcrops just mentioned are interesting because of the very various interpretations that have been put upon them in connection with prospecting and similar operations in this area. In a recent paper reference has been made to the fact that the disappearance of the outcrop of the Main Reef zone under a covering of later rocks in the neighbourhood of the Blue Sky mine, and the sharp bend in the continuation of the sub-outcrop in the neighbourhood of the Apex, the existence of which has been so thoroughly demonstrated by numerous boreholes, have rendered this locality the starting point for the most diverse suggestions as to the further course of the sub-outcrop of the Main Reef zone and other horizons. Some of these interpretations of the local geology necessitate a line of outcrop for the Main Reef zone considerably south of its generally accepted position, and such a line is sometimes obtained by joining up isolated outcrops such as those found in the small inliers above referred to, or such partial exposures as lie on the fringe of the younger rocks, as, for example, to the south-east of Boksburg Township. Individual beds of conglomerate may be found among the Kimberley and Elsburg reefs, especially in the Eastern Rand, which afford specimens having a close resemblance to the conglomerate of the Main Reef zone, and a line is sometimes drawn through outcrops of such reefs belonging to entirely different horizons and adopted as indicating the outcrop of the Main Reef. In such a fashion, outcrops of the Main Reef zone on the East Rand mines may be joined up with outcrops of the Kimberley reefs on Leeuwpoort to the south-east of Boksburg, and the line thus begun prolonged south-eastwards to join the outcrops of the Elsburg reefs to the south of the Van Dyk mines. Such supposed lines of strike are such as one might make on a hasty traverse with observations depending mainly on the eye alone. When the outcrops, however, are properly plotted by means affording reasonable accuracy and their relationships to neighbouring exposures duly represented the contradiction between the supposed line of strike and the true one is at once apparent to any unprejudiced observer.

Borehole Evidence.

The meagre evidence to be obtained at the surface has been materially strengthened by the data afforded by the numerous boreholes which have been put down in the Far East Rand area. An important fact that is confirmed by the records of these boreholes is the gradual thinning of the Upper Witwatersrand, in its individual members, towards the south-east:—

> To the east and south-east of the inliers above mentioned outcrops of the Witwatersrand System are practically absent until the neighbourhood of the Nigel mine is approached. The greater portion of the Far East Rand would be a very uninteresting tract of country to the geologist whose observations were restricted to the surface. Owing, however, to the large number of boreholes put down in the district, and the recent considerable extensions of mining operations, our knowledge of the deeper geology of the Far East Rand is very considerable. In connection with my survey of the East Rand, I have examined the records of practically all the principal boreholes in that area. Anyone undertaking a similar examination will find it in some respects a very tedious and unsatisfactory task. Many of the boreholes were put down in what are regarded as the earlier days of the field, the main object being the intersection and testing of the "reef." Consequently the records frequently take little account of many points which are of great value in the interpretation of the sections given by the holes. In some cases the records are the work of the drillman, whose determinations and descriptions of the rocks intersected are not always of the best. In some cases it is only by comparison of the records with those of neighbouring holes that the meaning of terms used in descriptions can be made out, and in the majority of the holes the want of a survey of the hole itself very materially affects the value of the section, especially in deeper examples. . . . . . Owing to the removal by denudation of the greater portion of the Kimberley-Elsburg Series over the area in question the beds intersected rarely extend far above the Kimberley shales, and are chiefly interesting in connection with the Main-Bird Series, the principal members of which, described already in connection with the Upper Witwatersrand System, are represented more or less throughout the Far East Rand. In connection with the sections at present under consideration, the following features may be briefly noted. The consistency of the results given by the various boreholes and shafts distributed over a considerable area is very satisfactory, and such variations as exist occur in a regular manner, which should allow of their application to other sections in the same neighbourhood. The thinning of individual members corresponding to a similar thinning of the whole series is most marked in sections taken in a N.W. to S.E. direction. It is less so in the section taken from N. to S., and scarcely apparent in the section taken in a N.E. to S.W. direction. The results obtained in various other sections constructed on similar lines indicates that these conditions are of more or less general application, and appear to me to point, like many other observations made both in the Eastern area and the nearer portions of the Rand, to the source of the sediments concerned having been situated to the north-west of the present Rand and to their having been distributed by a definite south-easterly current. In this connection the evidence afforded by the shape and mode of distribution of the patches of conglomerate shown by the principal reef of the Far East Rand has already been referred to in the paper on the Upper Witwatersrand System, and their probable origin under conditions allied to those of extensive deltas discussed.

Van Ryn and Nigel Reefs.

The identity of the Van Ryn Reef with that mined at the Nigel has been a subject of heated controversy, particularly during recent months. Dr. Mellor, it will be seen, has no doubt at all upon the point:—

> To turn now to individual members of the Upper Witwatersrand System: the unquestioned identity of the Van Ryn Reef (Main Reef Leader) with that of Brakpan, and the evidence afforded by a chain of boreholes connecting the reef at Brakpan with that at Springs and Daggafontein, and these again with the Nigel Reef, places the identity of the latter with the Van Ryn Reef beyond reasonable question. Such differences as are found in the reef at the two localities are consistent with all the intermediate evidence, and are not greater than those found in continuous bodies of reef exposed within the limits of a single mine. I have recently had opportunities of examining much valuable evidence from numerous borehole and shaft sections and from surface prospecting in the neighbourhood of the Nigel mine. The agreement between it and the Daggafontein section is remarkably close, and there can be no doubt about the correlation of the two, supported as it is by numerous intermediate boreholes.

The Banket Patches.

A prominent feature of the distribution of the banket beds in the Eastern Rand basin, as it may be called, is its arrangement in patches. The economic effect of this great variation along definite horizons is one that deserves special attention, especially since all the open ground still remaining to be financed and explored will be liable to be affected by the differences of opinion referred to in the concluding paragraphs of the following extract:—

> The marked arrangement of the whole of the reef in the Nigel mine in the well-defined patches described in the paper on the Upper Witwatersrand System and the corresponding mode of distribution of special portions of the reef in the Brakpan mines and at New Kleinfontein and Van Ryn, is not limited to these mines, which have been quoted as examples. Similar conditions are found to prevail, to a more or less extent, in many other instances, and borehole results show that they are also present in many localities from which no direct mining evidence is available. It seems probable therefore that such conditions will be found to obtain in many parts of the Far East Rand, and the evidence at present available points to such conditions being much more marked as we proceed further in a south-easterly direction from the northern outcrops, and to be most marked in the neighbourhood of the Nigel. Consideration of the distribution of the conglomerate patches in the Nigel mine shows how easy it would be in such an area to put down numerous boreholes without intersecting any portions of the reef, which nevertheless has been the basis of profitable mining for a period of nearly thirty years. This disposition of the conglomerate, or special portions of it, in well-defined patches over a large portion of the Far East Rand will probably afford opportunities for both optimists and pessimists to indulge in speculations agreeable to their own particular bent of mind. The former will be inclined to enlarge upon the desirable patches, and the latter to exaggerate the interspaces, and to deplore the fact that the whole area is not equally favoured by nature.

TRANSVAAL GOLD MINE DIVIDENDS.

List of Declarations for Half-year to December 31, 1915, made up to the time of going to Press.

The following is a list of dividends for the half-year ended December 31, 1915, declared by gold mining companies in the Transvaal up to the time of going to press. The complete list of mining dividends will, as usual, be published in a succeeding issue:—

Company.	Date.	No. of Dividend.	Rate %	On Issued Capital £	Amount £	Total Rate % 1915.	Total Rate % 1914.
Brakpan Mines	June.	7	17½	750,000	131,250	40	30
	Dec.	8	22½	,,	168,750	—	—
City Deep	June.	6	13¾	1,250,000	171,875	33¾	23¾
	Dec.	7	20	,,	250,000	—	—
City and Suburban	June.	31	7½	1,360,000	102,000	13¾	15
	Dec.	32	6¼	,,	85,000	—	—
Consolidated Langlaagte	June.	4	12½	950,000	118,750	25	20
	Dec.	5	12½	,,	118,750	—	—
Consolidated Main Reef	June.	14	6¼	924,364	57,772	12½	11¼
	Dec.	15	6¼	,,	57,772	—	—
Crown Mines	June.	28	35	940,106	329,037	65	85
	Dec.	29	30	,,	282,032	—	—
Durban Roodepoort	May.	82	10	125,000	12,500	25	25
	Dec.	83	15	,,	18,750	—	—
Durban Roodepoort Deep	June.	11	3¾	440,000	16,500	7½	7½
	Dec.	12	3¾	,,	16,500	—	—
East Rand Proprietary	June.	20	6¼	2,445,897	152,869	11¼	17½
	Dec.	21	5	,,	122,295	—	—
Ferreira Deep	Mar.	24	25	980,000	245,000	42½	75
	Sept.	25	17½	,,	171,500	—	—
Geldenhuis Deep	June.	31	10	585,753	58,575	20	18¾
	Dec.	32	10	,,	58,575	—	—
Geduld Proprietary	June.	2	5	970,000	48,500	10	5
	Dec.	3	5	,,	48,500	—	—
Ginsberg	June.	24	7½	210,000	15,750	15	17½
	Dec.	25	7½	,,	15,750	—	—
Glencairn Main Reef	Dec.	18	5	550,000	27,500	5	5
Knights Deep	June.	20	7½	743,526	55,764	15	10
	Dec.	21	7½	,,	55,764	—	—
Langlaagte Estate	June.	50	7½	886,500	66,488	15	10
	Dec.	51	7½	,,	66,488	—	—
Luipaardsvlei Estate	Dec.	4	3¾	472,012	17,700	3¾	—
May Consolidated	Dec.	32	5	288,750	14,437	5	—
Meyer and Charlton	June.	51	40	200,000	80,000	80	70
	Dec.	52	40	,,	80,000	—	—
Modderfontein B.	June.	6	32½	700,000	227,500	67½	55
	Dec.	7	35	,,	245,000	—	—
Modderfontein Deep Levels	June.	1	10	500,000	50,000	35	—
	Dec.	2	25	,,	125,000	—	—
New Goch	June.	6	5	550,000	27,500	10	-
	Dec.	7	5	,,	27,500	—	—
New Heriot	May.	42	40	115,000	46,000	75	65
	Nov.	43	35	,,	40,250	—	—
New Kleinfontein	June.	21	5	1,151,540	57,577	10	10
	Dec.	22	5	,,	57,577	—	—
New Modderfontein	June.	18	16¼	1,400,000	227,500	32½	30
	Dec.	19	16¼	,,	227,500	—	—
New Primrose	June.	44	10	325,000	32,500	17½	40
	Dec.	45	7½	,,	24,375	—	—
New Unified	June.	14	10	250,000	25,000	20	20
	Dec.	15	10	,,	25,000	—	—
Nourse Mines	June.	22	5	827,821	41,391	10	17½
	Dec.	23	5	,,	41,391	—	—
Randfontein Central	June.	4	2½	4,343,700	108,592	2½	—
Robinson	June.	46	8	2,750,000	220,000	14	18*
	Dec.	47	6	,,	165,000	—	—
Robinson Deep	June.	25	10	1,000,000	100,000	20	22½
	Dec.	26	10	,,	100,000	—	—
Rose Deep	June.	28	17½	700,000	122,500	32½	35
	Dec.	29	15	,,	105,000	—	—
Simmer and Jack	June.	26	5	3,000,000	150,000	10	10
	Dec.	27	5	,,	150,000	—	—

*Plus 10 per cent. bonus.

	Date	No. of Dividend.	Rate %	On Issued Capital £	Amount £	Total Rate % 1915.	Total Rate % 1914.
Van Ryn Estate	June.	23	22½	500,000	112,500	40	45
	Dec.	24	17½	,,	87,500	—	—
Van Ryn Deep	June.	4	10	1,196,892	179,534	32½	25
	Dec.	5	17½	,,	209,456	—	—
Village Deep	June.	14	10	1,060,671	106,067	21¼	21¼
	Dec.	15	11¼	,,	119,325	—	—
Village Main Reef	June.	29	20	472,000	94,400	20	70
Witwatersrand	June.	22	25	469,625	117,406	50	50
	Dec.	23	25	,,	117,406	—	—
Witwatersrand Deep	June.	19	15	550,000	82,500	28¾	32½
	Dec.	20	13¾	,,	75,625	—	—
Wolhuter	April.	15	6¼	860,000	53,750	12½	12½
	Oct.	16	6¼	,,	53,750	—	—
Sub Nigel	Dec.	6	2½	431,580	10,790	2½	5
Transvaal G.M.E.	Mar.	18	12½	604,225	75,528	22½	35
	Sept.	19	10	,,	60,442	—	—

PROSPECTS OF THE DIAMOND COMPANIES.

Annual Review of Position of Blaauwbosch, Pniel, New Thor, and S.A. Diamond Companies.

S.A. DIAMOND CORPORATION, LTD.

The second annual general meeting of members of the South African Diamond Corporation, Ltd., was held on the 20th Nov., at 2 Cheapside, Kimberley. There were present: Mr. G. Scott Ronaldson (presiding), Mr. N. F. Marcus, and Mr. J. D. Tyson, secretary (representing personally and by proxy 88,168 shares in an issued capital of £100,000). The report of the directors to 30th June, 1915, was mainly as follows: The capital of the corporation remains the same, *i.e.*, £1,000,000 registered, divided into two permanent directors' shares of £1,000 each, and 998,000 ordinary shares of £1 each. The issued capital on June 30, 1915, amounted to £100,000, *i.e.*, two permanent directors' shares of £1,000 each. and 98,000 ordinary shares of £1 each. Owing to the war all diamond mining operations have practically ceased, and the corporation cannot expect to do any profitable business until such operations can be resumed. It is satisfactory to record that since the cessation of hostilities in South Africa, the Pniels, Ltd., have resumed operations on a small scale, and the results for the ten months ending June 30, 1915, show a small profit. With increasing work your directors feel sure that the high hopes they entertain of this property will be fulfilled. On the outbreak of war operations at the Blaauwbosch mine were entirely suspended, but great care has been taken to keep the mine dry and free of reef, and operations in this quarter will be resumed as soon as practicable, with, it is hoped, the same good results as formerly. The New Vaal River Diamond Company, in which the corporation also has a large holding, is also working on a limited scale. Their financial position remains as strong as ever, and their directors were enabled to pay a dividend of 5 per cent. on December 31 last, being profits earned before the war. This company will make its usual good showing the moment operations can be extended

BLAAUWBOSCH DIAMONDS, LTD.

The sixth annual general meeting of shareholders in the Blaauwbosch Diamonds, Ltd., was held in the board room, 2 Cheapside, Kimberley, on the 20th November. There were present: Messrs. G. S. Ronaldson (presiding), Messrs. N. F. Marcus, M. M. Aronson, C. W. Bodley, and J. D. Tyson, secretary, representing personally and by proxy 17,546 shares in an issued capital of £24,500. The directors' report to 30th June, 1915, in brief, was as follows:—The nominal capital of the company is £24,500, fully issued. The company owns 100 morgen freehold under the title of "Catherine's Fancy," being a portion of the farm "Blaauwboschfontein" No. 229, district Boshof, O.F.S., and six-tenths of the mining rights over the said 100 morgen. Our lease of the Government's four-tenths share expired on the 30th of May, 1915, and we are in negotiation with Government for an extension on favourable terms. All the necessary work of maintenance, repairs, etc., has been carried on by the manager and the mine secretary, who consented to remain on the property at small salaries, and to these gentlemen we owe our thanks for their loyal assistance during times of stress. No mining has been possible during the period under review. Owing to difficulties consequent on the war we have not been able to repair the breakdown of the gas engine (mentioned in last report), but we are advised that the parts have been shipped, and it is our intention to put the machinery in running order, and be in a position to resume operations as soon as a revival of the diamond industry warrants it. It has been found more convenient to make up our accounts to the end of June, consequently the report and accounts before you are for a period of nine months. The Chairman said, *inter alia:* We have already made a start putting in order the many little troubles that arise consequent on the cessation of active mining operations, and we hope to be again producing at an early date. At the last annual meeting it was stated that the Treasury threatened an action for the recovery of profits tax. This action has since been heard, and went to appeal, but the decision was against us, and we have paid an amount of £2,326 12s. 4d., which covers profits tax from the passing of Act No. 6 of 1910 to June of last year. With reference to the accounts in your possession, these do not call for any special comment from me. The expenses of the year have been met out of the undivided profits, and as far as the financing of the company is concerned I am happy to inform you that the board have made arrangements with Mr. Bernard Oppenheimer to finance the company until operations at the mine recommence.

PNIELS, LTD.

The second annual general meeting of shareholders in Pniels, Ltd., was held on the 20th Nov. in the board room, 2 Cheapside, Kimberley. There were present: Mr. G. S. Ronaldson (presiding), Messrs. N. F. Marcus, M. M. Aronson, A. Gunning, and J. D. Tyson (secretary), representing personally and by proxy 85,055 shares in an issued capital of £100,000. The report of the directors to June 30th, 1915, was as follows:—We have pleasure in submitting for your approval the second report of the company, together with audited balance sheet and profit and loss account for the ten months ended June 30th, 1915. The authorised capital remains at £125,000 in 125,000 shares of £1 each, of which 100,000 are issued and fully paid. It has been found more convenient to make up the books to the 30th of June, consequently the accounts submitted are for a period of ten months. The gross revenue for the period under review amounted to £2,719 4s., and the expenditure to £2,448 7s. 10d., leaving a profit of £270 16s. 2d., which is carried forward. Digging operations were very restricted during the period owing to various causes connected with the war. In moving the adoption of the report and balance sheet, the Chairman said: When we last met I expressed the hope that by careful management and the exercise of economy we would be able to pay our way. You will see from the balance sheet that this forecast has been fulfilled, and we show a small profit amounting to £270. The period covered by the reports, etc., is ten months; if our accounts had run for the twelve months our profit would have amounted to approximately £650, consequently the directors feel they are justified in claiming, considering all the circumstances, that the position is satisfactory. Many of our diggers are still on active service, and naturally our operations have been very much disorganised. The manager's report gives you the returns of diggers working, their finds, etc. In spite of the fact that during half our financial period the price of diamonds was very low, the average price over the whole period amounted to £4 4s. per carat. The directors have continued their cautious policy, and believe they will be able to again show a small profit at the end of the current year, but until the world is again at peace we cannot hope for any important developments.

NEW THOR DIAMOND MINING COMPANY, LTD.

The fifth ordinary general meeting of shareholders in the New Thor Diamond Mining Company, Ltd., was held in the company's board room, 2 Cheapside, Kimberley, on the 20th Nov. The directors' report to 30th June, 1915, stated: The directors herewith beg to submit their report for the eighteen months ended June 30, 1915, together with audited balance sheet. The agreement entered into with Mr. Daubney to tribute the mine expired on the 28th February, 1915, and in view of the exceptional circumstances ruling, it has not been possible to make any new arrangements. The financial position of the company remains practically the same as at the date of our last report; the interest received on our deposits covering the running costs. The Chairman, in moving the adoption of the report and balance sheet, said: There is very little that I can tell you. The company, in common with all diamond mining concerns, has been in a state of suspended animation. The tribute agreement entered into with Mr. Daubney could not be carried out owing to the war and rebellion. We are indebted to Mr. Daubney and Mr. Bryne for looking after the mine and machinery during the troublous times through which we have passed, and subsequently. It is due to their efforts that no material damage was done, but one commando unfortunately destroyed a quantity of records and papers in connection with the working of the property. Mr. Daubney was put to considerable expense, and we are now endeavouring to arrive at a compromise with him, covering the question of commission due to us, and the expense he has been put to. Since the date of the last meeting the offices have been removed to Kimberley. I visited the property on the 8th inst., and, although everything is in as good order as one can expect under the circumstances, there can be no question that considerable expenditure will have to be incurred in replacing and altering the washing plant, engines, etc., before we can hope to arrive at a successful issue. Our cash reserves are sufficient for all requirements, and the directors are considering the advisability of resuming operations. As a personal expression of opinion, I may say that I am not satisfied with the tests that have been made or with the prospecting work done, but the shareholders can rest assured that the board is giving this matter their very serious consideration, and if we decide there is a chance of success, no efforts will be spared to ensure it. Messrs. Hesse and Daniel have resigned, and you will be asked to confirm the appointment of Messrs. MacGill, Ronaldson and Marcus to the board of directors.

PERSONAL.

His many friends on the Rand will rejoice to learn that Capt. M. I. Williams-Ellis, formerly manager of Sandycroft, Ltd., here, has written to say he is quite well, and has passed unscathed through a year at the Front.

* * * *

Mr. F. Leslie Brown, joint assistant manager of the Consolidated Gold Fields, and Mr. S. C. Mosel, of the Corner House, have accepted appointments with the East African Expeditionary Force, the former in the Mechanical Transport with the rank of Major, and the latter as D.A.Q.M.G. also with the rank of Major.

* * * *

According to an *African World* American correspondent, Mr. J. N. Bulkley, formerly consulting mechanical engineer to the General Mining on the Rand, is now domiciled at New York. He is consulting mechanical engineer to the Canadian Mining and Finance Company, controlling the Hollinger Gold Mines, Acme Gold Mines, and the Millerton Company.

* * * *

Mr. Dowsett, formerly superintendent of the Brakpan mill, is superintendent of the Dome Company's mill at Porcupine.

* * * *

Mr. W. S. Wetherspoon, formerly on the engineering staff of Rand Mines, Ltd., has just been appointed consulting mechanical engineer to the International Nickel Corporation, 43 Exchange Place, New York City, to which corporation Mr. Wm. Wallace Mein is consulting engineer.

* * * *

Mr. C. E. Addams, formerly general manager of Voorspoed, and previously on the staff of De Beers, has become general manager of the Ray Hercules Copper Company at Ray, Arizona, in which various influential American capitalists are interested.

* * * *

Mr. Fred Hellman, erstwhile general manager of the East Rand Proprietary Mines, is returning to New York for a visit, from the Chile Copper Mines, owned by the Guggenheims.

* * * *

Mr. Walter E. Park, so long the chief of the Fraser and Chalmers Company on the Rand, is the New York representative of Chalmers and Williams.

* * * *

The Board of Trade have appointed Mr. W. G. Wickham, at present H.M. Trade Commissioner in New Zealand, to be H.M. Trade Commissioner in South Africa, in place of Sir R. Sothern Holland, who is engaged under the Ministry of Munitions. Mr. Wickham will be succeeded in New Zealand by Mr. R. W. Dalton, of the Commercial Intelligence Branch of the Board of Trade. Mr. Wickham, who is 38 years of age, is the son of the late Dean Wickham, of Lincoln, grandson of the late Mr. W. E. Gladstone, and nephew of Viscount Gladstone. During Sir Sothern Holland's absence from South Africa, Mr. H. Gauntlett, his chief clerk, was appointed Acting Trade Commissioner at Capetown.

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Rhodesian Section.

RHODESIAN MINERAL OUTPUT FOR NOVEMBER.

Official Returns of Gold and Other Minerals from Southern Rhodesia for the Month

We have received for publication from the office of the Rhodesia Chamber of Mines (Incorporated) the following detailed statement of the mineral output for the month of November, 1915, with comparisons and values:—

MATABELELAND

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Bulawayo District—				
Abercorn (W. J. Lane)	5	220	95·13	394
Agincourt (Hogg & Co.)	5	188	89·91	373
Antelope G.M. (Rhod.) Ltd.	2B 2P 2T	3,980	892·49	3,700
Do. (slimes)	—	3,980	1,076·77	4,464
Anderson's (Est. R. Barkley)	10	500	38·46	159
Basch (Morrison & Granger)	5	500	38·46	295
Do. (sands)	—	350	30·76	127
Bassick (Bassick Mine Syndicate)	5	127	171·06	709
Bessie East (T. Berwitz)	—	250	40·58	168
Blanket (Blanket Syndicate)	15	696	100·73	418
Bulawayo Main A. (Aserman and Cormack)	2	237	49·26	204
Do. (sands)	—	126	23·86	99
Bunney's Luck (W. H. Rabbets)	2	149	86·59	359
Do. (sands)	—	—	2·91	12
Bushey Park (Berwitz & Robinson)	2	120	41·37	172
C. (D. & C. Syndicate), clean up	—	—	23·10	92
Carry (Boomerang Syndicate)	1 H	136	135·59	562
Do. (sands)	—	87	99·09	411
Coquette (W. H. Robinson)	2	184	37·37	155
Cottage (Cottage Syndicate)	4	210	80·68	334
Do. (sands)	—	158	20·71	86
Donore A.	2	30	52·87	219
Durban (Durban Syndicate)	2	108	274·51	1,137
Do. (sands)	—	80	95·45	395
Eagle A. (Macdonald & Co.)	10	949	198·88	825
Do. (sands)	—	420	21·08	87
Edward (Warren & Guest)	5	174	45·81	190
Excelsie (Excelsie Syndicate)	2	42	23·16	96
Farvic (H. S. Henderson)	5	1,020	328·09	1,392
Do. (sands)	—	384	29·83	127
Fernando (Trans. & Rhod. Est.)	10 2P	1,750	609·42	2,526
Do. (sands)	—	1,750	287·47	1,192
First Chance (Howe & Authers)	2	100	39·72	165
Germania	2	161	54·52	226
Do. (sands)	—	484	8·14	34
Godwin B. (Barrett & Stacey)	5	125	101·98	423
Do. (sands)	—	95	22·24	92
Great Belingwe (R. C. Boyes)	5	500	141·92	588
Gwen (McDonald & Co.)	(10)	167	20·83	86
Hildata (R. Aserman)	5	582	59·86	248
Do. (sands)	—	240	23·66	98
Inspector (W. H. Fletcher)	3	66	17·27	73
Intabanenda (Intabanenda Synd.)	5	460	123·88	514
Jeffs (Hortor & Stewart)	3	91	90·32	374
Jumpers (J. P. McCay)	5	420	204·59	848
Do. (sands)	—	180	43·07	179
Liberty (M. P. L. Syndicate)	1 H	200	15·82	66
Do. (sands)	—	210	14·85	62
Lone Hand (Armstrong & Furber)	5	390	139·07	576
Lonely Reef G.M. Co., Ltd.	20 3T	4,230	578·89	2,400
Do. (slimes)	—	4,230	2,034·05	8,432
Mab (E. T. Clayton), clean up	—	—	22·89	95
Matabele 3 (Criterion G.M., Ltd.)	10	350	183·87	762
Matabele Queen's Co., Ltd.	10	1,700	412·17	1,709
Do. (sands)	—	1,700	322·95	1,339
Mamba (Nicholls & Co.)	5	265	57·49	238
Do. (sands)	—	180	20·20	84
Mayfair (Arbery & Hicks)	5	412	110·28	457
Do. (sands)	—	390	32·44	134
Mons (Challen & Hall)	5	30	15·33	64
Mulloch (J. B. Richardson)	2	13	13·21	55
Nelly (F. D. Roscoe)	3 H	800	338·04	1,401
Do. (sands)	—	300	79·02	328
Nicholson (Cunningham & Allison)	15 1C	960	168·32	698
New Eclipse (J. R. Stewart)	5	594	252·85	1,048
Old Nic (Chart. & Gen. E. & F. Co., Ltd.)	15 4P	2,210	460·38	1,908
Do. (sands)	—	1,219	114·98	477
Peach A. (Peach Syndicate)	5	384	489·34	2,029
Penzance (Macdonald & Co.)	2	220	34·90	145
Do. (sands)	—	175	57·60	239
Prince Olaf (K. Johnsen)	5	197	116·29	482
Queen's West (Cumings & Berry)	3	210	67·16	278
Do. (sands)	—	190	50·46	213
Rubble (J. Gilpin)	5	110	23·95	99
St. Ives (R. Smith)	3	336	66·55	276
Silveretta (E. E. Beecroft)	5	89	12·12	50
Sinti (Gillman & McDonald)	—	—	6·84	28
Slope I. (E. E. Beecroft)	5	561	84·86	352
Star (Romola Nigel G.M. Co.)	5	290	102·37	424
Do. (sands)	—	165	35·22	146
Southern Cross (E. Basch)	5	450	65·35	271
Teutonic (B. & B. Syndicate)	5	120	25·91	107
Tuff Nut	5	190	91·51	379
Woolley Dog (P. H. Davis)	2	280	235·47	976
(E. N. Bearcroft), clean-up	—	—	43·35	180
Bulawayo district total			13,123·59	54,434
Gwelo District.—				
Alderman (Williams & Woodger)	3	200	48·06	199
Ardpatrick (C. Malcham)	3	255	116·50	483
Bedad (A. & B. Synd.), October	5	90	16·78	70
Bell Reef Dev. Co., Ltd.	2B 1T	3,914	1,640·10	6,799
Do. (concentrates)	—	4	17·32	70
Bonsor B323 (Cornish Syndicate)	10	1,096	127·71	529
Do. (sands)	—	975	66·88	278
Bonsor B327 (T. Roberts)	10	900	156·63	649
Do. (sands)	—	3,000	99·47	413
Cactus (Renton & Grey)	5	300	53·69	223
Do. (sands)	—	280	55·48	230
Camelia (S. Levin), sands	—	380	40·30	184
Collingwood (Wanderer Sel. G.M.)	—	958	72·12	299
Csardas (Wolfshall Syndicate)	10	634	552·20	2,289
Do. (sands)	—	450	93·80	391
Do. (slimes)	—	184	15·27	64
Dream (Dream Tribute Synd.)	5	280	31·88	132
Falcon Mines, Ltd.	31 3T	18,808	3,238·74	13,603
Do. (sands)	—	—	85·79	1,023
Do., copper, £15,145.				
Fed Up (A. Malcolm)	5	288	126·36	524
Fry (I. Bedlow)	5	292	94·04	390
Gaika G.M. Co., Ltd.	5 1C	2,956	1,458·00	6,124
Do. (sands)	—	1,404	60·50	254
Do. (slimes)	—	2,264	174·10	731
Glen Hume (Hume, Withey and Walker)	5	750	123·32	511
Glen Rosa (Glen Rosa Syndicate)	10	1,000	446·79	1,852
Do. (sands)	—	600	161·19	668
Globe and Phoenix G.M. Co., Ltd.	40 10P	6,492	5,175·81	21,738
Do. (sands)	—	5,415	1,598·56	6,714
Do. slimes)	—	2,122	543·06	2,281
Do. (concentrates)	—	313	477·82	2,007
King Solomon (A. E. West)	5	238	30·98	128
Leopard (Leopard Trib. Synd.)	5	630	106·04	440
L'Espoir (P. Harrower)	5	150	21·22	88
Lulu (C. W. Leppington)	2	184	63·51	263
Do. (sands)	—	300	48·26	200
Moss (W. M. James)	5	974	469·21	1,945
New Dunraven G.M. Co., Ltd.	5	800	118·56	492
Do. (sands)	—	600	30·79	128
Pacific (Wanderer Sel. G.M., Ltd.)	4GR	293	17·47	72
Pagamesa (W. H. Peard)	15 2P	620	394·74	1,636
Do. (sands)	—	590	90·73	376
Pondo (F. C. Luxat)	5	756	135·22	561
Do. (sands)	—	390	47·12	195
Selukwe Columbia G.M., Ltd.—				
Danga	10 1P	151	45·79	190
Do. (sands)	—	87	18·22	76
Wonderland	—	1,484	422·00	1,749
Do. (sands)	—	805	167·94	696
Yankee Doodle	10	1,462	226·84	941
Do. (sands)	—	975	138·75	575
Surprise (W. T. Woods), sands	—	500	23·58	98
Tabekwe 1 (A. N. Tyrrell)	20	2,053	261·05	1,082
Taxul (F. C. Luxat)	1 H	460	84·36	350
Do. (sands)	—	360	66·20	274
Trixie	10	1,011	337·75	1,400
Umpali (Bolt & Franks)	5	360	90·48	375
Do. (sands)	—	300	10·32	43
Veracity (L. R. Evans)	2	113	65·26	271
Do. (sands)	—	160	62·39	259
Walrus (L. R. Evans)	6	110	24·30	101
Wanderer (Selukwe G.M., Ltd.)	4GR	11 064	1,155·18	4,789
Zabonkwe (Holmes & Urquhart)	5	780	66·98	278
Do. (sands)	—	600	159·68	662
Gwelo district total			21,983·19	92,449

Matabeleland total	35,016·78 ozs.
Value	£146,884

MASHONALAND.

HARTLEY DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Arlandzer (Keir & Rooke)	10	1,500	86·21	357
Do. (sands and slimes)	—	1,500	197·20	817
Baltimore & Virginia (P. A. Enke)	5	465	51·12	212
Bijou (R. McInnes)	2	118	67·78	281
Blue Bird (R. J. Bray)	1 Pn	35	5·30	22
Brilliant (Mabel's Luck Syndicate)	5 1P	696	128·42	532
Do. (sands and slimes)	—	696	72·27	300
Brompton (R. R. Aitken)	5	650	95·46	396
Do. (sands)	—	500	52·20	216
Buffalo (E. A. Beghie)	5	368	92·72	384
Cam and Motor G.M. Co., Ltd.	R'tg.	11,938	4,506·41	19,107
Do. (slimes)	—	393	39·26	167
Cirl (H. F. Wilson)	5	80	14·63	61
Concession Hill & W. Ext. (C. E. Simpson)	5 1C	1,434	358·85	1.488
Do. (sands)	—	910	70·31	291
Dalny (Macdonald & Sale)	5 1C	1,867	82·62	343
Do. (sands)	—	1,527	145·60	604
Dalny 1 W. (Macdonald & Sale)	5	500	64·07	266
Do. (sands)	—	300	33·98	141
Dawn (Arrow Syndicate)	5 1P	790	128·98	535
Do. (sands)	—	790	27·81	115
Dreadnought	5 1C	111	22·73	94
Eiffel Blue (Willoughby's Con. Co.)	10	1,364	495·33	2,053
Do. (sands)	—	780	57·78	240
Do. (slimes)	—	180	7·73	32
Eileen Alannah Mining Co., Ltd.	12 2T	3,370	719·01	2,981
Do. (sands)	—	4,542	1,400·14	5,804
Enny Ext. (E. G. Goodyer)	5	520	106·42	441
Do. (sands)	—	368	26·39	110
Excelsior (Smith & Heard)	2	120	28·92	120
Fiasco Kaiser (A. Attilio)	5	400	134·39	557
Giant Mines of Rhodesia, Ltd.	30 2T	9,000	1,558·67	6,412
Glasgow Mines, Ltd.	5	474	126·40	524
Do. (sands)	—	224	40·93	170
Glencairn (Glenrosa Mines, Ltd.)	5	702	712·57	2,954
Golden Valley (J. Mack)	10	1,052	524·13	2,103
Do. (sands)	—	639	110·88	460
Guelph (J. & M. Davidson), September and October	3	120	30·29	126
Hepworth (V. L. Syndicate), sands	—	360	17·28	72
Heroine (V. L. Syndicate), clean-up	—	—	45·65	189
Inez (L. Highland)	10	1,200	290·04	1,202
Do. (sands)	—	760	66·98	278
Inkermann (I. J. Minnaar)	5	355	71·07	295
Do. (sands)	—	240	24·67	102
Kanyemba (Kanyemba Syndicate)	10	960	476·85	1,977
Do. (sands)	—	650	89·55	371
Klondyke (M. Nowak)	—	63	7·95	33
Masterpiece (J. McAdams)	5	300	57·37	238
Mudale (E. A. McDowell)	5	430	75·33	312
Old Chum (F. E. West)	5	144	44·23	173
Do. (sands)	—	100	9·44	36
Oleander (O. T. de Villiers)	3	400	106·65	442
Do. (sands)	—	500	56·51	234
Owl (A. Rolfe)	10	1,450	861·94	3,573
Do. (sands and slimes)	—	1.665	616·00	2,554
Pomposo (J. Knott)	5	324	119·84	497
Poverty (D. J. Laing)	5	700	77·35	321
Ross (E. H. Walsh)	5	144	44·23	183
St. George (J. Hussey)	2	160	70·25	291
Seigneury (Seigneury Synd.), Sept.	—	—	67·97	282
Do., November	10	1,228	156·18	647
Do. (sands and slags)	—	1,028	48·84	202
Shepherd's (Phoenician (Rhod.) Co.	5 1T	975	92·71	384
Thistle-Etna G.M., Ltd.	1 C	1,207	250·35	1,039
Do. (sands)	—	1,306	92·16	382
Trinidad	5	252	38·88	161
Victoria I.	4	100	17·27	72
Do. (sands)	—	120	11·36	47
Village Main I.	5	480	67·31	279
Village Main	5	250	21·82	90
Washington (I. J. Minnaar)	5	50	23·68	98
Do. (sands)	—	80	8·22	34
What Cheer (H. Moser)	5	425	234·77	973
Do. (sands)	—	650	103·19	428
White Rose	2	189	42·88	178
Hartley district total			17,128·19	71,381

LOMAGUNDI DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alluvial (N. Grillin)	—	—	1·70	7
Alluvial (E. G. Quarrie)	—	—	8·52	35
Andgwa (A. Smith)	2	30	4·62	19
Colorado (Digger Syndicate)	5	445	29·41	122
Do. (sands)	—	140	6·75	28
Eldorado Banket G.M. Co., Ltd.	20 1C 4P	4,058	2,075·20	8,716
Do. (sands)	—	4,041	760·55	3,194
Golden Kopje Prop. Mines, Ltd.	60 3T	9,995	898·70	3,774
Do. (slimes)	—	9,995	1,233·93	5,183
May (May Syndicate)	5	400	59·41	246
Do. (sands)	—	230	44·85	186
Mediteraneo (J. Perhat)	2	50	28·83	120
Medway (F. L. Standen), clean-up	—	—	23·40	97
Lomagundi district total			5,175·87	21,727

MAZOE DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alluvial (J. A. Broodryk)	—	—	7·12	29
Botha H. (Clarkson & Sons)	1 H	1,622	38·56	160
Do. (sands)	—	660	69·65	289
Blue Lagoon (Violet Lagoon Synd.)	2	120	19·76	82
Chin (Arrow Syndicate, Ltd.)	5 1P	850	306·96	1,272
Do. (sands)	—	850	117·74	488
Day Dawn (Day Dawn Tribute)	2	20	8·66	36
Do. (sands)	—	210	22·27	92
Jumbo G.M. Co., Ltd.	20	1,909	427·58	1,772
Do. (sands)	—	1,162	48·39	201
Do. (slimes)	—	747	31·78	132
Do. "Reno"	—	391	87·57	363
Do. (sands)	—	238	9·90	41
Do. (slimes)	—	153	6·50	27
Kandashaya	2	195	40·68	169
Kimberley (Mash.) G.M. Co., Ltd.	8 2T	4,650	875·80	3,714
Do. (sands)	—	1,950	375·03	1,590
Do. (slimes)	—	2,700	257·55	1,092
Kingsley Hoard (A. S. Warwick)	5	713	114·49	475
Do. (sands)	—	240	13·57	56
Micky (Micky Syndicate)	2	460	128·89	534
New Darwin (Howard & Southey)	2	40	17·79	74
Olive (A. Lover)	2	60	25·93	107
Promoter (F. C. Croxford)	1 C	1.539	44·85	186
Do. (sands), B. H. Jones	—	1,370	67·97	282
S.D.C. 3 E. (B. G. Byerley)	1 H	901	79·09	328
Syrian (F. A. Badenhorst)	—	64	24·50	102
Tat (W. M. Epton), sands	—	190	14·96	62
Venus (T. W Giles)	2	110	30·89	128
Yellow Jacket (J. J. Barger), sands	—	170	5·30	22
Mazoe district total			3.319·73	13,905

SALISBURY DISTRICT.—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alpes (P. Zaffere)	5	229	187·38	777
Do. (sands)	—	508	127·08	527
Beatrice (Scott Syndicate)	10	870	162·85	675
Do. (sands)	—	580	34·76	144
Black Cat (Black Cat Syndicate)	2	270	104·74	434
Ceylon (Ceylon Synd.), clean-up	—	—	105·78	438
Cross-your-Luck (Seb. & District Mines)	2 1P	220	63·15	262
Do. (slimes)	—	330	101·82	422
Found A. (Grey's Syndicate)	2	150	20·93	142
Do. (sands)	—	200	56·00	177
Inyague 3	2	80	17·85	74
Joker (Harrison & Drabble)	2	75	40·13	166
Do. (sands)	—	228	72·72	301
Kenilworth (Kenilworth Syndicate)	2	105	27·57	114
Koodoo (Est. R Tyron)	5	363	135·82	563
Do. (sands)	—	616	106·42	441
Louise Grand (H. S. Plant), Oct.	1 H	906	61·33	254
Do. (sands)	—	906	28·56	118
Do., November	—	800	35·21	146
Do. (sands)	—	800	30·92	128
Mashona (H. S. Plant)	2	95	55·05	228
Mill (L. Chiappini), sands	—	700	36·49	151
Mont d'Or (Claxton & Bussell)	5	321	140·11	581
Do. (sands)	—	138	13·42	56
New Agnes (Fungwe Dev. Synd.)	5	286	99·95	414
Planet (Planet Tribute Syndicate)	10 1P	550	147·87	613
Do. (sands)	—	550	137·04	568
Radnor (London and Rhodesia M. and L. Co.)	5 2P	860	451·06	1,870
Shamva Mines, Ltd.	56 8T	46,567	2,864·83	12,032
Do. (sands)	—	23,688	2,764·63	11,612
Do. (slimes)	—	22,687	2,647·73	11,120
Southern Cross (H. G. Bateman)	10	107	33·66	139
Sparti (pannings)	—	—	4·70	20
Salisbury district total			10,917·56	45,709

UMTALI DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Battery (F. E. Markham)	5	140	7·61	32
Black Jester (J. Wilesmith)	3	31	10·46	43
Constance (J. F. Kapnck)	5	1,155	101·60	421
Eyewitness (T. D. Maclean), pan'gs	—	—	4·11	17
Golden Gate	5	165	29·83	124
Grand Manika (Grand Manika Sd.)	5	220	42·30	175
Kent	10	400	95·31	395
Do. (sands)	—	320	39·49	104
Liverpool (R. G. Snodgrass)	5	640	160·63	666
Do. (sands)	—	220	73·48	305

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Montezuma G.M. Co., Ltd.	10	1,000	103·96	431
Pilgrim 2 E. (O. R. Cawood), sands	—	—	17·42	72
Rezende Mines, Ltd.	60	12,000	1,002·13	4,252
Do. (sands)	—	3,278	284·33	1,206
Do. (slimes)	—	1,622	131·50	558
Do. (concentrates)	—	15,355	435·29	1,834
Toronto (J. H. Jeffries)	—	510	59·49	247
Umtali district total			2,598·94	10,942
Victoria District—				
Empress (S.A. Pros. & Con. Synd.)	8	1,460	178·15	738
Do. (sands and slimes)	—	1,420	132·58	550
Sunbeam (Douglas & Durrell)	5	670	269·87	1,119
Wake Up John (S. Hemlock)	2	178	49·69	206
Victoria district total			630·29	2,613

Mashonaland total	39,770·58 ozs.
Value	£166,276
Grand total	74.877·36 ozs.
Value	£313,160

GRAND TOTAL.

	Quantity.	Value.
Gold, ozs.	74,877·36	£313,160
Silver, ozs.	16,338·33	1,603
Copper, tons	302·90	15,145
Coal, tons	39,369·00	11,964
Chrome iron, tons	9,072·00	26,325
Asbestos, tons	229·15	3,666
Lead, tons	1·56	39
Diamonds, carats	52·75	207
		£372,109

GOLD OUTPUT COMPARISONS.

	Ozs.	Value.
October, 1915	81,161·29	£339,967
November, 1915	74,877·36	313,160
Decrease	6,283·93	£26,807

Grand totals to date: Gold, 8,183,428 ozs.; silver, 2,036,009 ozs.; lead, 7,095 tons; copper, 4,504 tons; chrome iron, 385,189 tons; coal, 2,300,603 tons; tungsten ores, 129·10 tons; antimony, 13·75 tons; arsenic, 76 tons; asbestos, 3,357 tons; diamonds, 10,813·75 carats; other precious stones, 90,069·50 carats.

C: Chilian Mill. T: Tube Mill. G.R: Gates Roll. H: Huntington Mill. P: Grinding Pan. Pn: Pneumatic Mill; D: Dolly.

LATEST RHODESIAN MINING NEWS.

Shamva—Insiza Mines—Mayo (Rhodesia) Development

Active operations are in progress at the Shamva to test the value of the ore deposit at the No. 5 level. At the date of the annual report the position was by no means certain. Since then, however, things have both moved and improved. Of the three cross-cuts to which reference has been made, one—No. 5—is completed, and shows 40 ft. of ore averaging 6·11 dwts. In No. 6 cross-cut values appear to be fairly good, for the 35 ft. exposed average 5½ dwts., including the last section, which gave 6½ dwts. The full width of the reef is not yet determined. The other cross-cut—No. 7—has just got into reef matter. All three workings are towards the south, results being disappointing apparently in a northerly direction. The average width of the reef cannot be stated until further cross-cuts have been put in. During the past month or two the quantity of ore crushed has decreased, and simultaneously the recovery has fallen, not to any great extent it is true, and working expenses have risen. This means that the profit per ton and the total profit are lower. The following is a statement of the cabled working results for the past six months:—

	Tons.	Recovery. £	p.t.	Working costs. p.t.	Profit. £
October	47,050	£37,030	15/9	8/11	£16,013
September	47,534	37,665	15/10	8/7	17,183
August	49,263	39,287	16/2	8/7	18,142
July	50,207	38,490	15/4	8/1	18,280
June	49,205	39,077	15/8	8/2	18,726
May	49,131	38,956	15/10	7/11	19,484

Presumably, there is a good explanation of the rise in costs. It may, of course, be due in part to the higher cost of stores and to the charge in connection with the Blinkwater Railway guarantee.

* * * *

The ordinary general meeting of the Mayo (Rhodesia) Development (1908), Ltd., was held in mail week. Mr. C. F. Rowsell presided, and, in moving the adoption of the report for the year ended July 31 last, observed that interest and dividends for the period amounted to £3,589 against £3,033. The loss, which had to be carried to the balance sheet this year, was £1,057 as against £820 a year ago. The profit now carried forward was, by the loss for the year, reduced to £6,775, while they still had standing to the credit of premium on shares account £10,000. Investments showed a considerable depreciation at the moment, but he did not think this undue having regard to the state of affairs under which investment securities were now valued. They might look forward to the continuance of substantial dividends from Lonely Reef and Shamva. The report was adopted.

* * * *

The report of Insiza Mines, Ltd., for the year ended June 30 last shows the following results of operations carried on by tributors during the period under review: Gold produced, £21,263; royalties received, £2,690. The lower returns from royalties are due to the mill on the Nelly Mine being closed down for over three months, owing to a defect in the pumping plant. But for the delay thus incurred, the returns would doubtless have equalled those of the previous year.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

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CORRESPONDENCE AND DISCUSSION.

The Royal Alfred Aged Merchant Seamen's Institution.

To the Editor, *South African Mining Journal.*

Sir,—When one considers the truly great and heroic part British merchant seamen are taking in the war, their claim upon the generous consideration of all is unquestionably established. That one of these brave fellows should stand in need of a helping hand when forced by age or affliction to abandon the sea would be, one ventures to affirm, an ingratitude to those to whom as a body Britain owes her commercial prosperity, and to whom to a degree most apparent of late she is indebted for the very daily necessaries of life. At one time it could be truly said that Britain was the only great maritime nation without a provision for its merchant seamen, but with the establishment of the Royal Alfred Aged Merchant Seamen's Institution that stigma was removed, and for half a century this great national charity has provided a home or pension for thousands of aged and destitute seamen of the British mercantile marine. Like many other old-established institutions, the " Royal Alfred " has felt the pinch of war conditions and the competition of the numerous funds for worthy objects arising out of the present national crisis. An earnest appeal is therefore made to Britons in all parts of the world to help the Committee of this old sailors' charity to make good the deficiency and to answer the urgent " signals of distress " from hundreds of hard-pressed mariners who have given the best years of their lives in the service of their country. Contributions kindly directed to the Royal Alfred Institution at 58 Fenchurch Street, London, E.C., will be gratefully acknowledged by.—Yours, etc.,

J. BAILEY WALKER, Secretary.

58 Fenchurch Street, London, E.C.
Christmas, 1915.

Swaziland Tins.

The following are the particulars of this company's output for the month of November: Concentrate recovered, 33·996 long tons; estimated profit (taking the price of tin at £150 per ton), £888; to which must be added £240 (being adjustments in respect of previous shipments); total, £1,128.

Manicaland Output.

We have received the following information from the Director of Mines for the Territory of the Companhia de Mocambique:— Reef: Gold won by milling (fine), 121 ozs. 2 dwts. 5 grs.; tons crushed, 415; value, £502 0s. 2d. Alluvial: Gold won (fine), 493 ozs. 1 dwt. 5 grs.; cubic metres dredged, 44,335; value, £2,043 18s. 1d.

Mining Proclamations.

It is notified that the following areas are to be proclaimed under Chapter IV., Precious and Base Metals Act, No. 35 of 1908, of the Transvaal, viz.:—The farm Koolbult No. 13 (formerly No. 163), *alias* Schapenrust, in extent 295 morgen 200 square roods, as a public digging for base metals; and that portion of the farm Doornhoek No. 68 (formerly No. 1358, district Lydenburg), district Barberton, mining district of Barberton, formerly held under mynpacht brief No. 580, in extent 194 morgen 326 square roods, as a public digging for precious metals.

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Good Order from Portuguese Government—Retrospect of 1915 and Prospective of 1916.

The holidays have quite interfered with the mining material trade; in fact the Commercial Exchange has been one of the quietest places of business in Johannesburg during this broken week of pleasure. Notwithstanding this, tenders have been asked for by the Portuguese Government at Delagoa Bay for electrical supplies amounting in the aggregate to about £2,000. The matter appears one of urgency, as 25 per cent. of the order has to be supplied from stocks in South Africa and the remainder from oversea direct to Delagoa Bay. It is expected that the tendering will be cut very fine in price as the payment is assured. No one firm will get the whole order, as those having part stocks, it is understood, will be encouraged to tender.

A Retrospect of 1915.

The big firms carrying heavy stocks have had a very fair year for business and profits on the whole. The disadvantages have been trying at certain periods of the year, as the mines seem to have purchased heavily in fits and starts, when lulls came and so upset the best laid plans and calculations. It is estimated that the mines have almost doubled their stores on hand as compared with a year ago, which in a measure accounts for the deadly dulness prevailing. Those firms who originally had stocks of doubtful lines, owing to newer and better things arriving from time to time to take their place, have scored in placing much through the uncertainty of obtaining goods from oversea. And in consequence of this uncertainty our local foundries have been called upon to try their 'prentice hand upon work which not so long ago seemed an impossibility for a Johannesburg factory to tackle. Then again the war conditions have consolidated Johannesburg as a distributing centre, coupled with the fact that the traders had from time to time, almost imperceptibly, accumulated vast stocks of a most varied description, some of which had practically been relegated to the scrap heap from a financial basis, but the difficulty experienced in freight and the continuous demand from the whole of South Africa, especially for goods out of the ordinary ruck, turned much of the once apparent dead stock into a revenue-getter. The weak feature has been amongst the smaller merchants, commission men, and in a lesser degree representatives of oversea firms who carry no stocks, but trade on indenting for goods. The fact is that business as a rule has been quite good in all heavy lines for maintenance works and the everyday upkeep of the producing mines. However, those having spot goods secured most of the prizes as compared with forward orders, as merchants have been chary throughout the year of absolutely guaranteeing the completion of orders at any given time. As a result of judicious enquiries the year's trading can be summed up as being quite good and profitable for the firms carrying big stocks, but for others having to rely upon obtaining goods from oversea to supply orders the business actually done and the profits earned have been on the lean side, but not so lean as to do away with fair and reasonable profits.

The great outstanding feature of the year has been the bid made by America and Canada to secure a very strong footing in our South African market, and so far considerable success has been attained in that direction, especially in mining material, steel and hardware goods. Another feature has been the extraordinary fillip given to our own efforts in making bar and angle iron from "scrap," of which there was a superabundance as a result of the accumulations from the railways and mines ever since these fields were first established. Then again the South African cement industry has gone ahead by leaps and bounds, simply because the imported article has become less and less owing to the military requirements in Europe for trench and other works. Whilst there was a great deal of prejudice against South African cement, that prejudice has been knocked on the head, because in actual practice our cement is excellent, therefore the industry in the Transvaal and Orange Free State has been well and soundly established, not only because the article is good, but it is one of those things that can be manufactured sufficiently cheap to hold its own against the oversea article. The timber trade has not altogether been over-brilliant, for although we have had spasmodic spells of activity in the building trade, yet it has not been consistently good. The mines have bought a little freer since the report of the Earth Tremors Commission, but on a sufficiently large scale to make up for the slackness in the building trade.

According to a commercial and mining broker, practically all merchants have experienced a good year. He agrees with what has been previously written that firms holding just the kind of stocks when actually wanted have done extra well, both in their big turnovers and the extra profits secured. He also maintains that the smaller merchants, brokers and indent commission men have done well, some of course more and some less, chiefly governed by the chance or luck in getting goods shipped from Great Britain. The brokers have done well in buying from one merchant and transferring to others, the great majority of whom have been anxious to keep up good assorted lines likely to be in demand from time to time. In conclusion, it is quite pleasant to record that, notwithstanding all our troubles and the great war, our merchants catering for the mines have on the whole had a very satisfactory year.

The Prospects for 1916.

This is a more difficult problem to treat upon; nevertheless it is of such imperative importance that a serious attempt has to be made to give an intelligent forecast. The merchants are anything but unanimous on the subject. The prevailing opinion favours the idea not to be caught with large stocks bought at these fabulous prices, as one representative remarked, that an unexpected peace would certainly create a sharp reaction in values, no doubt to be followed by a steadying up process, as very much would depend upon shipping freights, and even these in the aggregate would not be likely to advance because they would be shorn of all the war charges now very much in evidence. An importer of engineering goods and machinery is of an opinion that no serious fears need be entertained for the first twelve months after peace, because it will take the factories a long while to catch up with normal conditions, both as regards skilled labour and the overhauling of machinery to bring the factories in anything like the condition as prevailed in the pre-war days, at least in Europe. What merchants seem to fear most is, if they are caught with big stocks the values will drop more on account of the American competition rather than that from Europe. One or two merchants who have hitherto been fairly successful in gauging the position are of opinion that this time next year will be time enough to talk about being caught with too heavy stocks, as the enemy is still on the Allies ground, and well in at that, with constant fortifying of places as well as entrenching. Therefore in taking a broad view of the position it appears that the original three years' estimate of the war will be nearer the mark than any amateur can estimate. Nevertheless if the records put up at Christmas time by the retail traders is any guide, it is pretty safe to anticipate that the mining material people need not seriously bother themselves about having too much stock, always providing they can do a little financing if anything like a crisis occurs through a hurried termination of the war or its likelihood.

Revised Price List.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d., 19s. 6d. and 22s. 6d. (local do., 14s. 6d. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 2¾d. lb.; drill, 4¾d.

lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8½d., 11 ft. 9d., 12 ft. 9½d.; 26 gauge, 6 ft. to 10 ft., all lengths about 8d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 30s. to 31s. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9½d.; over, 9¾d. to 10¾d. (Oregon, 10⅛d.); flooring, 4½ x ⅞ and 6 x ⅞, 4½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4½d.; pitch pine, 5s. 7d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 24s., boiled, 24s. per 5 galls.; white lead, 52s. 6d. to 54s. per 100 lbs.; turps., 46s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yard; 3/20 coils of wire, 25s.; do., 3/22, 21s.; tubing, 12s. to 13s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 12s. 6d. per 100; P.O. insulators 18s.; motors, 3 h.p., about £30 new.

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THE WEEK IN THE SHAREMARKET.

Holiday Tone— Prices Firm with Improving Tendency.

The week has been featureless in the market, owing to the predominating holiday feeling. All the dividend payers and the popular small Far East Rand shares continue in good demand. Tins are quiet and diamonds lifeless. After the holidays a further improvement is expected in the market, and the excellent distributions of the Far East Rand companies should have a good effect. It is too early to anticipate the Rand gold output for the year, but it should serve to emphasise the sound position of the industry.

	Thurs., 23rd.,	Fri., 24th.	Tues., 28th.	Wed., 29th.	Thurs., 30th.
African Farms	7 3	7 3*	7 1*	7 9	7 3*
Apex Mines	7 0*	7 0*	7 6†	7 0*	7 0*
Aurora West Uniteds	8 6*	8 6*	8 6*	8 6*	—
Bantjes Consolidated	6 0*	7 4*	7 6*	8 11	8 6
Brakpan Mines	66 3ʌ	66 0*	65 0ʌ	—	66 0*
Breyten Collieries	20 0*	20 6*	20 0*	20 0*	21 0*
Brick and Potteries	—	5 0*	5 0*	—	5 0*
Cassel Coals	20 3†	—	—	—	—
Cinderella Consolidated	5 0	4 6*	4 6*	4 6*	4 6*
City and Suburbans	39 0*	39 6	39 6*	39 6*	39 9
City Deeps	73 3*	73 9*	73 3*	73 6*	73 6*
Cloverfield Mines	6 0*	5 11*	6 1*	6 0*	6 1
Clydesdale Collieries	13 6*	13 9*	13 6*	13 6*	13 6*
Concrete Constructions	2 6†	2 6†	2 6†	2 0†	2 0†
Consolidated Investment	13 6*	13 6*	13 6*	13 6*	13 6*
Consolidated Langlaagtes	36 0*	35 0*	36 6†	—	35 0*
Consolidated Main Reefs	19 6*	19 10½	20 0†	19 6*	19 9*
Consolidated Mines Selection	13 0*	13 3*	13 3*	13 3*	—
Coronation Collieries	25 0*	25 0*	25 0*	25 0*	25 0*
Coronation Freeholds	0 3†	—	—	—	—
Coronation Syndicates	2 0*	—	—	—	—
Crown Diamonds	2 3*	2 3*	—	—	—
Crown Mines	60 0*	60 0*	60 0*	60 0*	61 0*
Crown Mines Debentures	£99½*	£100*	—	—	—
East Rand Centrals	2 11*	3 0*	—	3 0*	—
East Rand Coals	2 1*	2 0*	—	—	2 1*
East Rand Deeps	1 2*	1 0*	1 1*	1 1*	1 1*
East Rand Minings	6 6*	6 6*	—	6 6*	6 6*
East Rand Proprietary	21 9†	20 0*	21 6†	20 0*	20 0
Eastern Gold Mines	1 5†	1 0*	1 0*	—	1 0*
Frank Smith Diamonds	1 6*	1 7*	1 6*	1 6*	1 6*
Geduld Proprietary	34 3*	34 6*	34 9	34 3*	34 6*
General Minings	7 0*	7 0*	7 0*	7 0*	7 0*
Ginsbergs	7 6*	7 6*	—	—	—
Glynn's Lydenburgs	—	—	10 0†	10 0†	10 0†
Goerz & Co.	—	—	—	13 0†	13 0†
Government Areas	30 3	30 0ʌ	29 6*	30 0*	30 9*
Jupiters	6 6*	6 9*	6 9*	6 9*	6 9*
Klerksdorp Proprietary	1 9†	1 9†	—	—	—
Knight Centrals	10 8*	10 6*	10 9	10 7*	10 8*
Knights Deeps	24 0†	24 0†	—	—	21 0*
Lace Proprietary	4 6	4 6*	4 6*	4 7*	4 6*
Langlaagte Estates	—	—	17 0*	17 0*	17 0*
Luipaardsvlei Estates	—	7 0†	7 0†	6 0*	6 0*
Lydenburg Farms	5 6	5 9	5 6	5 6*	5 9
Main Reef Wests	6 3*	6 3*	6 3*	6 4*	6 4*
Meyer and Charltons	115 0*	115 0*	115 0*	115 0*	115 0*
Middelvlei Estates	1 0*	1 0*	1 0*	1 4†	1 4†
Modderfontein B.	118 6	118 6*	119 0	120 0*	120 0*
Modderfontein Deep Levels	112 0	110 0*	111 6	112 6	112 6*
New Boksburgs	—	0 10*	0 10*	0 10*	1 0*
New Eland Diamonds	8 0*	8 0*	8 0*	8 0*	8 0*
New Era Consolidated	7 3*	7 3*	7 3*	7 6*	7 4*
New Geduld Deeps	3 0*	3 0*	3 0*	3 0*	3 0*
New Gochs	13 0*	13 0*	13 0*	13 0*	13 0*
New Kleinfonteins	25 6*	25 9	25 10½	26 10½	27 0
New Modderfonteins	311 3*	313 9*	—	313 9*	315 0*
New Rietfonteins	—	—	0 3*	—	—
New Unifieds	16 0†	14 6*	16 0†	16 0†	16 0†
Pretoria Cements	45 0*	46 6†	46 6†	46 6†	46 6†
Princess Estates	—	—	3 6*	3 6*	3 6*
Rand Collieries	—	2 6†	—	—	—
Rand Klips	5 3*	5 4	5 2	5 2*	5 4
Rand Nucleus	1 4*	1 4*	1 4*	1 4	1 4*
Randfontein Deeps	3 0*	—	—	3 2*	3 0*
Randfontein Estates	—	13 0†	—	13 3†	13 0†
Roberts Victors	10 0*	10 0*	10 0*	10 0*	10 0*
Robinson Deeps	21 0*	—	—	—	—
Rooiberg Minerals	15 0†	15 0†	15 0†	15 0†	15 0†
Roodepoort Uniteds	4 6*	4 6*	—	4 9*	5 0
Shebas	—	2 0†	2 0†	—	1 6*
Simmer Deeps	1 6*	1 7*	—	2 0†	1 6*
S.A. Breweries	32 0†	32 0†	32 0†	32 0†	32 0†
S.A. Gold Mines	—	12 6†	12 6†	—	—
S.A. Lands	3 3*	3 2*	3 3*	3 4*	3 4*
Springs Mines	37 0*	37 3	37 6	37 3*	37 0*
Sub Nigels	10 9*	10 9*	10 9	10 3*	10 3
Transvaal Coal Trust	47 6*	48 0*	48 0*	49 0†	47 9*
Transvaal Consolidated Lands	12 6†	11 0*	12 6†	12 6†	—
Transvaal Gold Mining Estates	26 0*	26 0*	26 0*	—	26 6
Tudors	—	—	—	—	2 0†
Van Dyks	1 6*	—	1 6*	—	1 9*
Van Ryn Deeps	58 0*	58 0	58 3	58 6	58 6
Van Ryn Estates	50 0*	50 0*	50 0*	50 0*	50 0*
Village Deeps	36 0†	35 0†	35 0†	—	35 0†
Vogelstruis Consolidated Deeps	0 9*	0 10*	0 9*	0 10*	0 10*
West Rand Consolidated	8 6*	8 6*	8 6*	8 6*	8 6*
Western Rand Estates	—	1 0*	—	—	1 0*
Witwatersrands	57 6†	—	57 6†	56 0*	54 9*
Witwatersrand Deeps	26 3*	26 6†	—	26 3†	25 9
Wolhuters	9 6	9 6*	10 0†	9 11*	9 6*
Zaaiplaats Tins	10 3*	10 3	—	9 0*	9 0*

* Buyers. † Sellers. ʌ Odd lots.

South African Railways.

The statement showing the approximate traffic earnings for the week ended December 18th, 1915, contains the following particulars, *inter alia*:—Week ended 18th December, 1915: Passengers, £91,769; goods, £114,651; coal, £27,133; live stock, £10,516; total earnings, £257,907. Correspondweek, 1914 (audited): Passengers, £76,183; goods, £98,605; coal, £29,839; live stock, £9,981; total earnings, £227,677. 1st April, 1915, to 18th December, 1915 (approximate): Passengers, £2,452,948; goods, £4,086,358; coal, £1,323,747; live stock, £421,940; total earnings, £8,792,340. 1st April, 1914, to 18th December, 1914 (audited): Passengers, £2,252,495; goods, £3,872,605; coal, £1,322,289; live stock, £349,550; total earnings, £8,286,025.

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AFRICAN AND EUROPEAN INVESTMENT COMPANY.

Position and Prospects of the Land and Share Interests.

The eleventh ordinary general meeting of the African and European Investment Co., Ltd., was held on December 2nd at the offices of the company, Threadneedle House, 34, Bishopsgate, E.C., Mr. C. F. Rowsell presiding.

The Chairman, in the course of his remarks, said: The income from dividends and debenture interest, etc., after deduction of interest charges, amounted to £5,570, as against £12,254 last year. Dealing now with the company's assets, the land holdings constitute the main basis of your company, and I think it is the unanimous opinion of all who are well acquainted with land values in South Africa that our holdings stand us in at a very reasonable figure, having regard to the fact that they are situated in some of the best districts in the Transvaal. The disturbed condition of South Africa during the year under review has naturally militated very severely against any further settlement. Very strong efforts are being made by the company to extend the development of its land by encouraging the settlement of suitable tenants. South Africa is still passing through an undoubtedly critical time, but under the leadership of men like Botha and Smuts, and those who are associated with them, I have no doubt that the development will be entirely on the right lines. It is natural, however, that until the position in South Africa is entirely clear, and normal times are restored, we cannot anticipate that general improvement in prosperity which is the basis of the advance in the value of land. I am sufficiently optimistic, however, to believe that the time for this has only been postponed by the war, and that as soon as war conditions are over the progress of South Africa, which had commenced on such satisfactory lines, will continue at an ever-increasing rate.

VEREENIGING ESTATES INTERESTS.

With regard to our share interests and other holdings, one of our largest is in the Vereeniging Estates, Ltd., in which we hold a considerable number of shares, in addition to £200,000 debentures. We may look upon this as an extremely valuable and well-secured investment. The Vereeniging Co., in adition to having exceptionally valuable land from an agricultural point of view, is one of the largest coal producers of South Africa, and the output has recently reached a tonnage of 49,320 tons a month. Their principal customer is the Victoria Falls Power Co., with whom there is an agreement by which they take the whole of their coal requirement for their station at Vereeniging from the Estates Co. With reference to the agricultural interests of that company, they are very important; the question of irrigation is being very closely studied, and there seems little doubt that the total value of the 129,000 acres which the Vereeniging Estates owns can be enormously increased by the adoption of irrigation. Vereeniging is rapidly becoming the centre of great industries, because not only has the largest Victoria Falls Power Station been erected on the estate, but in addition the Vereeniging Co. has established important brick and tile works, and the Union Steel Corporation of South Africa has established an up-to-date steel works. The effect of these industries being established is greatly to increase the value of the Vereeniging Estates land, and particularly of the township, which is becoming a very valuable property. The Estates Co. holds the bulk of the stands in that township, and this is a great and improving asset. This company has an interest in the Union Steel Works, and I have every hope that they have now passed through their most critical stage, and that the future of the company will be a profitable one. One of the features of the market during the past few months has been a great revival of interest in the Far East Rand. The general public are beginning to realise the enormous importance of the undeveloped gold-mining areas in that district. This has naturally arisen from the remarkable developments which have taken place on such properties as the Springs, the Government Areas, the Geduld, and generally in the district. Our company is largely interested in this direction, as it has a considerable shareholding in the East Rand Mining Estates—which practically controls two of the most important areas in the district, Grootvlei and Palmietkuil—and we are also interested in the East Rand Extension Gold Mining Co. These interests require a considerable amount of capital for further development, but the date when it will be possible to raise the necessary means for the future development and equipment of properties in this district is rapidly becoming nearer.

RHODESIAN HOLDINGS.

Our principal interest in Rhodesia is the Rhodesia Gold Mining and Investment Co., whose main interests are in the Lonely Reef Gold Mine, the Cam and Motor, and the Sabi mines. The Lonely Reef mine has been earning profits for a considerable time, and last year paid a 20 per cent. dividend. That company has recently passed through two bad levels, and has struck the reef in the 15th level with most satisfactory results. In the 15th level, at the point at which the reef was cut, the assay was 1 oz. 17 dwt. over 54 inches; at 5 ft. south the reef assayed 1 oz. 3 dwt. over 53 inches; at 10 ft. south 2 oz. 16 dwt. over 64 inches; and at 5 ft. north the assay was 2 oz. 18 dwt. over 58 inches. As this is the lowest point reached in the mine, I think you will agree that these results are highly satisfactory. The Cam and Motor—in which the Rhodesia Gold Mining Co. holds a large interest—has now solved the question of extraction. It is anticipated that this company will reach the dividend-paying stage in the course of the next year, and it should eventually prove to be as great a mine as was originally anticipated in its early days. The Sabi mine, in which we also indirectly hold a large interest, is not at present working, but it has a very considerable amount of ore developed, and at a later date should be a satisfactory producer. In conclusion, I sincerely hope that when we meet again next year it will be under better auspices, and that the great war from which we are now suffering will be at an end. You may well understand that a company of our character has suffered very materially from the effects of the war, but we feel perfectly certain that so soon as the war is over, and conditions are again favourable, none of its interests will have been materially injured, and we should begin to move forward to a prosperous period.

The Chairman concluded by moving the adoption of the report and accounts.

Mr. J. B. Hilliard seconded the motion, which was carried unanimously.

The retiring directors were re-elected and the auditors were reappointed. The proceedings then terminated.

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Van Ryn Gold Mines Estate, Limited.

REPORT OF DIRECTORS

Submitted at the Twentieth Ordinary General Meeting of Shareholders, held at Winchester House, London, E.C., on Wednesday, the 15th day of December, 1915, at 12 o'clock noon.

The Directors beg to submit their Twentieth Annual Report, together with the Balance Sheet as at the 30th June, 1915, and the Profit and Loss Account for the twelve months ended that date, and accompanied by Reports of the Managing Director and Manager on the operations at the mine during the same period.

PROFIT AND LOSS.

The net profit realised during the year amounted to		£262,143 14 7
To this has been added :—		
The balance brought forward from the previous year		16,165 2 3
Making a total available profit of		£278,308 16 10
Which has been appropriated as follows :—		
For payment of—		
Dividend No. 22	£112,500 0 0	
Dividend No. 23	112,500 0 0	
Taxes...	23,276 11 6	
Union Government War Levy (first moiety)	5,706 19 0	
Sundries, as per Appropriation Account	8,825 19 6	
		262,809 10 0
Leaving a balance to be carried forward to the current year of		£15,499 6 10

MINING OPERATIONS.

The mill ran 332.6 days, and with accessory tube mills crushed 462,920 tons of ore, yielding 137,815.576 ounces of fine gold, of the value of £579,996 8s. 5d., or at the rate of £1 5s. 0.693d. per ton. Working expenditure amounted to £344,298 12s., or 14s. 10.501d. per ton milled, resulting in a profit of £235.69 16s. 5d., equal to 10s. 2.197d. per ton.

This result does not differ materially from that of the preceding year. While the ore treated has been greater in quantity by 23,020 tons, it has been of a slightly lower grade (25s. per ton as compared with 26s. 10d for last year). Working Expenditure on the other hand has been reduced from approximately 16s. for last year to 14s. 10d. per ton for the current year, thus showing a net reduction of 8d. per ton.

ORE RESERVES.

The Manager's estimate of the ore reserves at the close of the financial year under review is as follows:—

Fully developed—1,953,000 tons of an average value of 6.20 dwts. over 54 inches.

Partially developed—18,000 tons of an average value of 9.9 dwts. over 40 inches.

In compiling the above estimates all ore of a value below 4.3 dwts., of which 1,121,000 tons have been either fully or partially developed, has been excluded and for the time being classified as unpayable. It is quite possible that a substantial portion of this tonnage will eventually prove capable of profitable handling.

The position as regards payable tonnage fully developed remains practically the same as that at the end of last year, a small decrease in quantity and a reduction of .29 dwt. per ton in value being recorded.

In accordance with custom no credit appears in the Balance Sheet for these reserves, the cost of which has been met out of past profits.

CAPITAL EXPENDITURE.

Except for an outlay of approximately £450, incurred in the fencing of our property, the expenditure on Capital Account has been confined to certain additions to our plant and machinery, of which the more important is the installation, in conformity with Government Regulations, of two new Dump Spraying Plants. The total expenditure, amounting to, roughly, £2,500, has been provided out of current revenue.

WATER SUPPLY.

It is satisfactory to record that the position of our water supply shows a marked improvement compared with that of a year ago. In the meantime copious rains have fallen, with the result that both dams on the Company's property were filled to their utmost capacity, and a full supply of non-potable water is assured for some time to come from the Company's own sources.

DIVIDENDS.

The year's revenue has admitted of the declaration of the following dividends, which were paid on the dates set opposite each respectively, viz. :—

No. 22, of 22½ per cent. (less Tax), 11th January, 1915,

No. 23, of 22½ per cent. (less Tax), 15th July, 1915,

making, together, 45 per cent., or 9s. per share for the year.

A detailed list of the dividends, amounting to £2,144,500, paid since the incorporation of the Company, will be found in the usual annexure attached to this Report.

INVESTMENTS (WAR LOAN).

The Directors have participated on behalf of the Company in the subscription of 3½ per cent. Government War Loan Stock to the amount of £100,000.

RETIRING DIRECTORS.

Under the provisions of the Company's Articles of Association, Messrs. Leopold Albu and P. G. Hamilton Carvill retire, and, being eligible, offer themselves for re-election.

AUDITORS.

Messrs. Deloitte, Plender, Griffiths and Co., the Auditors, retire in accordance with Clause 148 of the Articles of Association, and, being eligible, offer themselves for re-election.

GENERAL.

It is a pleasure to the Directors again to record their appreciation of the services rendered by the Manager and his staff under Sir George Albu, the Managing Director, and of the satisfactory results which continue to attend their efforts on the Company's behalf.

F. A. GILLAM, Chairman.

T. FREDK. THORNE, Secretary.

63-4, Winchester House,
Old Broad Street, London, E.C.
6th December, 1915.

Van Ryn Gold Mines Estate, Limited—continued.

Dr. BALANCE SHEET, 30th June, 1915. Cr.

Dr.

To Capital Authorised and Issued— 500.000 Shares of £1 each, fully paid		£500.000 0 0
,, Reserve Account		40,000 0 0
,, Creditors and Credit Balances—		
South Africa	£68.677 15 7	
London	12,401 0 8	
Profits Tax	22.827 16 0	
Income Tax	7,427 10 8	
Special War Levy	5.706 19 0	
		117.041 1 11
,, Bills Payable		11.000 0 0
,, Unclaimed Dividend Accounts, Nos. 1 to 22		4.502 10 5
,, Shareholders for Dividend No. 23		100.781 5 0
,, Balance from Appropriation Account		15,499 6 10
,, Contingent Liability—		
On Shares in other Companies—		
Witwatersrand Native Labour Association: 507 Shares of £1 each, at 8s. per Share	£202 16 0	
Witwatersrand Co-operative Smelting Works, Ltd.: 1.169 Shares of £1 each, at 12s. per Share	701 8 0	
Native Recruiting Corporation, Ltd.: Balance of Deposit at 12s. 6d. per head on 2.949 natives	1.843 2 6	
	£2.747 6 6	
		£788,824 4 2

Cr.

By Property			£200,000 0 0
,, Mine Equipment—			
Permanent Works		£28.437 13 1	
Machinery and Plant, Cyanide Works and Slimes Plant		272.029 7 7	
Buildings		20.000 0 0	
Reservoirs, Dams and Water Service		2.000 0 0	
		322.467 0 8	
Less written off		2.467 0 8	
			320.000 0 0
,, Mine Development, 1.953.000 tons fully developed			520,000 0 0
,, Stores		15.867 7 1	
,, Stores (in transit)		1.469 13 10	
			17,337 0 11
,, Furniture in London and at Mine		206 0 8	
,, Live Stock, etc., at Mine and Farm		385 0 0	
		591 0 8	
Less written off		91 0 8	
			500 0 0
,, Shares in other Companies— Witwatersrand Native Labour Association: 507 Shares of £1 each, 12s. per Share paid ... ... Rand Mutual Assurance Co., Ltd.: 152 Shares of £10 each, fully paid ... ... Witwatersrand Co-operative Smelting Works, Ltd.: 1,169 Shares of £1 each, 8s. per Share paid Native Recruiting Corporation, Ltd.: 30 Shares of £1 each, fully paid, and 7s. 6d. Deposit on Account of £1 per head on 2.949 Natives			1.713 16 9
			539.550 17 8
,, Sundry Debtors & Debit Balances			5.761 4 4
,, Gold in Transit ...	£18.060 0 0		
,, Cash and Investments—			
On Deposit at Bankers (inclusive of accrued Interest to date, since received)	90.562 6 3		
On Current Account at Bankers in London and South Africa, in transit and in hand	41,488 1 3		
		150.110 7 6	
,, £100.000 3½ per cent. War Loan, 1925-8, at cost	£94,489 15 3		
Less Depreciation written off	1,989 15 3		
	£92,500 0 0		
Add Accrued Interest to date (since received)	901 14 8		
		93.401 14 8	
			243.512 2 2
			£788,824 4 2

T. FREDK. THORNE, Secretary.

Signed on behalf of the Board,

F. A. GILLAM,
LEOPOLD ALBU, Directors.

To the Shareholders of the
Van Ryn Gold Mines Estates, Limited.

We have examined the above Balance Sheet with the Books and Vouchers in London, and have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company affairs according to the best of our information and the explanations given us and as shown by the Books of the Company in London and the audited Returns from South Africa.

5, London Wall Buildings,
London, E.C., 17th November, 1915.

DELOITTE, PLENDER, GRIFFITHS & CO.,
Chartered Accountants, Auditors.

Van Ryn Gold Mines Estate, Limited—continued.

Dr. PROFIT AND LOSS ACCOUNT from 1st July, 1914, to 30th June, 1915. Cr.

Per ton crushed. s.	d.			
		To Working Expenditure (462,920 tons crushed)—		
7	1.763	Mining	£165,421 13 11	
1	9.741	Milling	41,934 11 7	
0	6.481	Sorting, Crushing and Transport	12,500 19 0	
1	5.405	Cyaniding (Sands and Slimes 462,920 tons) ...	33,571 0 9	
1	10.767	Mine Development	43,913 19 6	
1	1.703	General Charges (Mine)	26,431 1 7	
0	0.052	Permanent Works	100 10 0	
				£323,873 16 7
13	11.912			
		,, General Charges— Johannesburg—		
		Salaries, Management Commission, Bank and Legal Charges and Exchange	9.309 18 11	
		Insurance Premiums paid in London	975 11 8	
0	5.332			10.285 10 7
		London— Rent, Secretarial Remuneration, General Charges, Advertising, Printing, Stationery, Postages, Cablegrams, Audit Fees, Agency Charges, Directors' Fees, Percentage on Profits and		
0	5.257	French Government Tax		10.139 4 10
14	10.501			344.298 12 0
10	2.197	,, Balance carried down ...		235.697 16 5
25	0.698			£579.996 8 5

Per ton crushed. s.	d.		
25	0.698	By Gold Account	£579,996 8 5
25	0.698		£579.996 8 5

To Balance to Appropriation Account	£262.143 14 7
	£262.143 14 7

By Balance brought down		£235.697 16 5
,, Additional Revenue—		
Rents and Sundry Receipts	£3.137 12 0	
Transfer Fees	102 16 6	
Interest on Deposits and Investments	4.203 1 7	
Brokerage	312 1 9	
Rand Mutual Assurance Co., Dividend Account	121 12 0	
		7.877 3 10
,, Landlords' Licences Received ...	574 12 0	
Less Licences and Rents Paid ...	294 0 0	
		280 12 0
,, Mine Development Suspense Account		18.288 2 4
		£262.143 14 7

APPROPRIATION ACCOUNT.

To Amounts written off as under—		
Mine Equipment—		
Machinery and Plant	£2,029 7 7	
Permanent Works	437 13 1	
		£2,467 0 8
Sundries—		
Furniture in London and at Mine	56 0 8	
Live Stock, etc.	35 0 0	
War Loan (3½ per cent.), 1925-8	1.989 15 3	
		2,080 15 11
,, Taxes—		
Transvaal Government Tax	22.827 16 0	
Less Refund of amount overpaid 1914	180 10 0	
	22,647 6 0	
Income Tax	629 5 6	
		23.276 11 6
,, Miners' Phthisis Compensation Fund		4,278 2 11
,, Dividends—		
No. 22 (22½ per cent.) declared 16th December, 1914	112.500 0 0	
No. 23 (22½ per cent.) declared 16th June, 1915	112.500 0 0	
		225,000 0 0
,, Special War Levy by Union Government—1st moiety of 50 per cent. of Profits Tax for 1914-15		5,706 19 0
,, Balance to Balance Sheet		15.499 6 10
		£278,308 16 10

By Balance at 30th June, 1914	£16,165 2 3	
,, Balance from Profit and Loss Account	262,143 14 7	
		278,308 16 10
		£278,308 16 10

Engineering Notes and News.

The Status of an Engineer.

[By J. H. Veasey.]*

My experience seems to have furnished abundance of proof of the necessity for the practice of engineering being regulated by law. I was in Rhodesia some fourteen years, and consider that the disrepute into which Rhodesian mining has fallen is due to the wholly incompetent and unprincipled individuals who at different times masqueraded there as consulting engineers. The practices of medicine, dispensing, dentistry, law and land surveying are regulated by law, but the practice of mining engineering —which was to make or ruin the country—was not regulated. Hence if a man wished to practise as a mining engineer he simply had to state that he *was* a mining engineer, get someone to believe him and employ him, and he was established. We had cases of an amalgamator from the Rand becoming an "engineer and battery manager" in Rhodesia. The ex-assistant assayer would be a consulting metallurgist, and the assistant surveyor, to whom promotion was long deferred, because he could not obtain his certificate, became a consulting mining engineer. In such circumstances the necessity for regulating the practice of the profession was obvious. It is a human weakness that the owner of mining ground prefers to believe the optimistic report, even though there may be no grounds for optimism. A competent engineer who gave an honest report of what was in sight and what expenditure present prospects justified would find that he was not wanted. The managing director would say, "I cannot raise money on the London market on a report like this. I want something encouraging," and so the competent engineer was replaced by the man who would report as his managing director wanted to suit his flotation schemes and the market conditions. A sixty-stamp mill would be erected where ten stamps were justified. A mine would be floated for perhaps £250,000 before the first level was completely developed. A few shallow boreholes down and the reef intersected in a third of their number was in one case practically all the work the development company could show when the gold mining company was floated; meanwhile those concerned congratulated themselves on their finance. I remember a rumour being current that one company which had installed a roasting process overlooked the presence of calcium carbonate in their ore, with the result that their first slimes residue was discharged by blasting and quarrying. Of course all things adjust themselves in time, as the number of defunct Rhodesian mining companies will prove, and some of these consulting engineers (?) are now farmers purveying milk and eggs, others are looking for clients, but the lasting damage remains, some people are ruined, most have lost money, none will subscribe more. To those who say it is a man's own fault if he loses his money, etc., I would like to reply that there are cases when people require protection from themselves and their friends. A capitalist is a potential asset to the State in which he lives. When the capitalist loses his money the State loses its asset; hence it would seem the duty of the State to its people to provide that the capitalist can only employ properly qualified technical advisers. I see nothing to object to in examinations, and would even like to see competitive examinations introduced for filling important vacancies or positions generally carrying a fair salary; better men would be supplied for the posts, unknown good men would be given a chance, and perhaps a few incompetents who depend only on their seniority would be side-tracked. Should it be decided to admit engineers to practice only by examination we have an excellent model to follow in the associate membership examination of the Institution of Civil Engineers, where Section A., comprising mechanics, is compulsory; but Section B. contains nine subjects, of which the candidate selects the two in which he intends to specialise. I fail to see what objection anyone can have to the present examinations of the Mines Department; they are eminently adapted to practical men, and there is no demand for the school matriculation certificate to be produced, as in the case with other professions. A man who cannot pass has no right to be in charge of his department, and I think that an engineer who values his status will not work under a service certificate. A service certificate is all right if issued for six months, but at the end of that time the holder should take the examination. It seems paradoxical for an engineer to call himself "practical" and the examination "theoretical," and to consider himself such a "good man" that the examination is unnecessary in *his case* and beneath him. It would be better for such a good man to take an "Honours" certificate and thereby add substantially to his status as an engineer. While not approaching trades-unionism, this Institution should protect its members. A rumour was current a while ago that a prominent engineer was nominated for the position of manager of an important mine, but that he was disqualified "because he was an engineer." When the fact of being a competent, successful and respected engineer becomes a disqualification it is time for the Council to take action in the interests of the profession and the defence of its members. In other countries the status of an engineer places him on a higher plane—a limit is not placed on his aspirations, for we find Mr. John Hays Hammond an Ambassador for his country.

---

*Contribution to discussion of Mr. J. Broad Roberts' paper, read before the South African Institute of Engineers.

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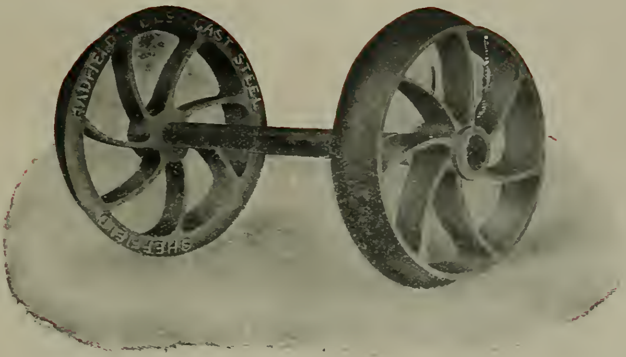

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The Week's Meetings.

LUIPAARDS VLEI ESTATE AND GOLD MINING.

ANNUAL MEETING.

Improved Results.

The 20th ordinary general meeting of the Luipaardsvlei Estate and G.M. Company Ltd., was held on the 2nd December, 1915, at Winchester House, Old Broad Street, London, E.C., Mr. Alexander Davidson (Chairman of the Company) presiding.

THE CHAIRMAN'S SPEECH.

The Chairman said: Gentlemen,—It is with some gratification that the directors come before this general meeting able to recommend to you the resumption of the payment of a dividend, although not a very large one. I hope that now we shall have the same pleasure for many years to come. The report and accounts have been duly circulated among you, and I presume we may, as usual, take them as read. In speaking to the motion that they be adopted, I shall first ask your attention to the profit and loss account and the balance-sheet. The profit and loss account shows gold sales £225,413, against £217,842 in the preceding year, and licences, rents and other revenue, less maintenance and repairs, £10,805, as against £11,012 in the preceding year, the total revenue amounting to an increase of £7,540, which is accounted for by the increase in tonnage crushed, the new tube mills having begun to take effect for a few months of the year. On the debit side of the account the working expenses have beeen very large, from a variety of causes. First, the exceptional rainfall (referred to in the directors' report) and the overflow from the Lancaster and York mines are responsible for the heavy increase of £6,724 in the pumping costs. Then the rise in the prices of everything we use in the mine and reduction works, consequent on the war, accounts for a good many thousands, not to speak of the increased Government taxes. The amount we have written off for development redemption is this year larger by £4,344 as compared with the year before, but on the other hand it has had the good effect of reducing by £2,645 the already moderate figure at which our development account stands in the balance-sheet. The other items in the profit and loss account are self-explanatory and do not call for remark. Turning to the balance-sheet, you will see that the capital issued is unaltered, while the Debentures have been reduced from £87,555 to £79,965. There is no change in the reserve account, £28,137. On the assets side of the account we have reduced the cost of the estate, etc., by £2,008, the machinery and plant by £6,334, and the development account by £2,645. The permanent works, shafts, etc., account is unaltered, and stores account is larger by £2,847. Lower down you will note that we had still to come in at the date of the balance-sheet a considerable sum for gold purchased by the Bank of England. We have still a considerable sum to come in at the present moment, but we are now expecting payment of it almost immediately. There are no other figures, I think, that I need at present comment upon.

ORE RESERVES.

The general manager's report for the year, which was sent you with the directors' report, contains a full and detailed account of the various developments in the mine and of the operations at the reduction works throughout the year, as well as an indication of the projected underground work about to take place. I shall, therefore, have but little to add to his remarks, which seem to me to be very clear and concise, and to show a thorough grasp of the essentials he has to deal with. The position of the ore reserves is very satisfactory, showing a considerable increase in the year, although with a slight reduction in average value owing to an accidental occurrence referred to by the manager, to which, however, the directors do not attach any importance in view of subsequent improvements in the stope faces values, and to the fact that so far the reserve ore in the East Battery reef has not been taken into the ore reserves. This section of the mine continues to develop satisfactorily, and the local secretary reported in last week's mail as follows: "Development at the Battery reef east section, has disclosed values of 9 dwts. over a milling width of 36 ins., the actual reef exposed being 70 ins. The shaft has been sunk a further 16 ft." He adds: "At the western section of the Luipaardsvlei property the lower levels are developing satisfactorily, in the 21st level the assays averaging 11 dwts. over 36 inches." In connection with the ore reserves I may call attention to the important fact that the cost of their development now stands in our books at less than 1s. 3d. per ton of fully developed payable ore, whereas we are allowing as a charge against working expenses 3s. per ton for every ton of ore crushed. Various capital outlays, in addition to the works in the mine and on the surface, as detailed in the manager's report, have been made during the year, amounting to £4,600. During the current year we expect to expend in this direction perhaps a little more, it being a fixed principle with us to keep the mine and estate thoroughly equipped and to see that they shall starve for nothing. The directors' report gives you an encouraging account as regards native labour, and at present I believe that we need not apprehend anything different ahead in this respect. Our white employees, you will be glad to see, have responded excellently to the calls upon them consequent on the war, both in person and in pocket, and I think we must cheerfully bear the inconvenience arising from our losing so many of our skilled men.

THE PROSPECTS. .

With regard to the prospects of the company for the future, we take a hopeful view, and I think I cannot conclude my remarks better than by referring you to the paragraph in our report where we tell you that the average monthly working profit since July has been £4,418, and, so far as I can see, we have no reason to anticipate any falling off. As usual, we have a cablegram up to date to lay before the meeting, which is satisfactory: it was received yesterday: "Manager reports native labour satisfactory. Good value 21st level west main reef, 6¾ dwts. 48 inches. South reef western part of the property opening up well. Estimate of November tonnage, 21,200 tons; recovery, 5¼ dwts. Cannot estimate profit until 4th December. Future prospects of the mine good." With these remarks I beg to move formally: "That the report of the directors produced, together with audited statement of the company's accounts to the 30th June, 1915, be now received, approved and adopted, and that the recommendation of the directors of a cash dividend of 3¾ per cent. (9d. per share), less income-tax, payable on the 22nd day of December, 1915, on the 472,012 issued shares of the company be confirmed." When that has been seconded I shall be pleased to endeavour to answer any questions that any shareholder may wish to put.

Sir Leigh Hoskyns, Bart., seconded the resolution.

Mr. W. H. Skeel said that those who were original shareholders and who had followed the company through its many changes were much more satisfied this year with the result of the operations and with the dividend which was declared. In previous years the directors had given reasons more or less convincing, for the various changes which had been made, but now that they were proposing a dividend of 9d. per share, and had been told there were better prospects ahead, he did not think the shareholders ought to approve of the report and accounts without expressing their thanks to the management on the other side and to the directors for what they had done in order to bring about such a satisfactory result.

Mr. Bowen said that so far as the dividend was concerned he was a little disappointed In his opinion the directors could have paid a dividend of 5 per cent. He considered that a monthly profit of £4,000 was a very small return; Luipaardsvlei should do better than that.

The Chairman, in reply, said that as regarded the dividend distribution, he had always set his face against prophesying, but he thought the shareholders might take some comfort from the fact that the profits earned in the first three or four months of the current year were considerably more than double the average of last year. They could not do more than pay what they could spare, as it would not do to impoverish the company, because at any time they might have occasion to lay out considerable sums of money. They did not anticipate having to do any such thing, but their experience in the past had shown them that it was always advisable to have something laid aside. The dividend of 9d. per share was the amount they were declaring for the year ended 30th June last.

The resolution was carried unanimously.

The retiring directors (Messrs. H. D. Boyle and W. Dettelbach) were unanimously re-elected, and the auditors (Messrs. Turquand Youngs and Co.) were reappointed

On the motion of the Chairman, seconded by Mr. Bowen, a cordial vote of thanks was passed to the local committee on the other side, and also to the manager and staff for their devotion to the company's business during the past year; and the sum of £50 was voted to the British Red Cross Society

The proceedings then terminated.

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CONTENTS.

PAGE
Notes and News ... 431
Topics of the Week:
Mining Questions for the New Year ... 433
The Dividend Position ... 434
The War and the Union Ports ... 434
Far East Rand—III. ... 435
The Disposal of the Far East Rand Gold Mines ... 436
Ferreira Deep Results and Prospects ... 437
Miscellaneous Dividends for 1915 ... 439
Handling Rock Drills Underground on the Rand ... 440
November Output: Group Returns ... 441
Underground Accidents on the Rand ... 442
The New Coal-Dust Experiments ... 443
Rhodesian Section:
Latest Mining News ... 443
Electrolytic Precipitation of Gold, Silver, and Copper from Cyanide Solution ... 444
Correspondence and Discussion: " Rand Geology "; " Mining Dividends "; " British Trade Fair, 1916 " ... 446
The Week in the Mining and Material and Engineering Trades ... 447
The Week in the Sharemarket ... 449
Engineering Notes and News:
The Distribution Plant of the Johannesburg Municipal Electric Supply System ... 450

Notes and News.

Volksrust-Wakkerstroom Railway. The new railway connection between Volksrust and Wakkerstroom is said to be practically completed. It will give much needed transport facilities to that area adjacent to the Transvaal-Natal border, which is reported to possess extensive seams of oil shale and some excellent coal. Whether the line will be continued to Piet Retief from Wakkerstroom remains to be seen. There is a "nek" a few miles east of Wakkerstroom which is considered to be somewhat of a difficulty, together with some rough hilly country on the Piet Retief side. With the Piet Retief-Natal connection that is already in operation beyond the Pongola bush, however, there seems no urgent need of a further extension just yet beyond Wakkerstroom. The Government would, doubtless, be willing to assist in the improvement of such roads as would be required for purposes of mineral traffic in the same way that assistance has been given elsewhere, in the Rooiberg district, for instance.

* * * *

Kaalvallei. It has been rumoured lately in London, that a well-known diamond mine, now dormant, is about to be transferred from its present owners to a big group in the diamond trade, and it is locally reported that the concern referred to is the old Kaalvallei Mine, formerly belonging to the Robinson Diamond Mining Co., Ltd., and more recently to the Orange Free State and Transvaal Diamond Mines, Ltd. The undertaking has been in want of adequate capital for some time past, although Sir J. B. Robinson long ago expressed his willingness to contribute a large sum towards the necessary fund provided the shareholders agreed to take up the balance. Nothing came of these proposals, and the company has since gone into liquidation. The latter process will doubtless simplify matters as far as dealing with the mine is concerned. It is said that those who are well qualified to give an opinion about the property are favourably impressed with its possibilities. Mr. B. Williams has been in charge of the place for some months.

* * * *

The Vira Mine. We are informed that operations have been discontinued at the Vira Mine, in Zululand. This property, it will be remembered, was taken in hand last year by several persons who were prominent in local labour circles, and Mr. Jones, previously a mine captain at Driefontein, was appointed manager

* * * *

Frank Smith Diamonds. The report of the directors of the Frank Smith Diamond Company, submitted at the meeting held on Friday, the 17th day of December, 1915, at 11.30 a.m., covers the year from the 1st July, 1914, to 30th June, 1915. The results obtained during the month of July, 1914, have already been reviewed in last year's directors' report. Upon the outbreak of the war it became necessary to suspend all operations, and the mine has remained closed down since then. The property and plant have been placed in charge of one of the employees, who, with a small staff of natives is efficiently safeguarding it. Thanks to the assistance of the two largest shareholders, it has been possible to provide funds for the maintenance of the property, for payment of claim licences and other outgoings. Expenditure in every direction has been reduced to the lowest possible point. At the commencement of the war the company found itself with a considerable stock of diamonds, which had accumulated during the first half of 1914, as during that period realisation at the valuation placed upon them had not been possible. The directors are pleased to report that during the last few months nearly the whole of these diamonds have been disposed of at satisfactory prices, and that the company's indebtedness has been correspondingly reduced. Steps have been taken to augment the revenue obtainable from the company's farms (41,054 acres). Instructions were recently given to investigate some localities on these farms, which appear favourably situated for the occurrence of diamondiferous ground.

The Bushveld Tin Area.

A good deal of interest is being taken at the moment in the prospects of finding payable tin ore in that large region east of the Pretoria-Pietersburg Railway line, which is commonly known as the "Bushveld" in distinction from that district on the western side, where the Zaaiplaats, Nylstroom and Rooiberg occurrences are located. The collapse of the famous Bushveld Tin Mines, and those phenomenal deposits which first of all drew attention to the tin-bearing possibilities of that part of the country, led to the abandonment of extensive operations there. On a small scale, here and there, work has been carried on intermittently ever since, mainly by small syndicates. Prospectors have, nevertheless, been constantly busy in the district, and the success of such undertakings as Mutue Fides, in spite of its ungrammatical name, in the northern portion of the Bushveld, has tended to confirm the reports of those who still pin their faith to the practically unexplored granite-felsite country, north-east of Pretoria. Indications of cassiterite, as was remarked in this journal many months ago, are to be found a little distance east of Waterval Station, and between this point and the extreme limits of discovery in other directions the field for investigation is a very large one, and, geologically speaking, a favourable one.

* * * *

East Rand Proprietary.

The following is the text of a cablegram despatched to the London Office of the East Rand Proprietary Mines on January 5:—" December results: 820 stamps milled 177,000 tons; 49,293 ounces fine gold recovered, valued at £204,800; profit for the month, £32,618. In the above are included the following results of the accumulated slime treatment; 658 ounces fine gold recovered, valued at £2,734; profit for the month, £1,941. In addition to slightly lower grade of ore milled the results of month were adversely affected by hoisting operations at the Driefontein shaft being interrupted, owing to a fall of rock in the shaft, resulting in a loss in tonnage of approximately 15,000 tons. It was at first thought that the delay caused and consequent loss of tonnage would be insignificant, but subsequent examination of the shaft showed that extensive timbering was necessary in order to guard against similar occurrence."

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New Heriot.

A meeting of shareholders in New Heriot Gold Mining Company, Ltd., was held in London in mail week, Mr. F. J. Dormer presiding. He observed that the return to shareholders for the year amounted to 15s., compared with 13s. for the previous year. He thought this said a great deal for the management during a very trying year. The total amount paid out to shareholders, including the dividend to be paid before the end of the year, was £1,336,935. That payment, on a capitalisation of £115,000, must be considered very gratifying. Messrs. F. J. Dormer, D. J. Pullinger, L. Wagner, and G. H. Raw were re-elected members of the London Committee for the coming year.

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Middleburg Steam Coal.

By degrees, the Middleburg Steam Coal and Coke Company is getting rid of the Transvaal Gold Trust, though apparently the greater part of the money that has been advanced will never be recovered. It was decided at the meeting held in 1914 not to make further loans to the Trust, so that presumably the increase of £3,195 in the amount had been transferred from the profits of the Middleburg Company to the Gold Trust previous to the meeting. As far as can be seen from the Middleburg accounts, the position is as follows:—June 30, 1914, £27,021, less written off £15,000, leaving £12,021; written off in the present balance sheet £5,000, leaving of the original advances £7,021. In the accounts now to hand the loan is shown as £10,216, so that during the year under review £3,195 was handed over, as mentioned above, evidently for necessary expenses. Against the outstanding balance there is a reserve fund which might, if necessary, be used. The net profit on trading of the Middleburg Company was £13,045: an interim dividend of 2½ per cent. was paid in June, and a final dividend of 5 per cent. is recommended, leaving £4,390 to be carried forward. The output of coal was considerably hampered owing to the war conditions prevailing. With the close of the expedition to German South-West Africa more normal conditions have prevailed with regard to the supply of rolling stock on the railway. The costs of production have been increased, owing to the largely-increased prices of timber and all mining stores. There has consequently been little additional expenditure upon the Lydenburg gold claims. They are at present under lease to a syndicate of tributers which has now recommenced production. They report that they have cleared out and secured the whole of the workings in the lower mine which had collapsed owing to the floods, while in the upper mine the reef newly discovered had widened out to 4 ft. and was 9 dwts. value.

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Spitzkop Farm Gold.

The report of the Spitzkop Farm Gold Company, Ltd., for the twelve months ended 30th June, 1915, states that the tributing syndicate during the year crushed 14,762 tons of ore, the estimated yield being £13,150, equal to 17s. 10d. per ton, the company's royalty on which amounted to £1,973. The smaller operations by other tributors resulted in a royalty of £75. The total royalty for the year was £2,048, as compared with £2,125 in the previous year, but the figures are subject to adjustment as, owing to war conditions, final account sales have not yet been received. The total revenue for the year amounted to £2,298. After charging the concession dues and other expenses in South Africa and London, there remains a credit of £991. Since the end of the year the directors applied for and had allotted £2,000 of the Four and a Half per Cent. War Loan, and have likewise availed themselves of the opportunity of converting the £4,300 Consols held by the company into Four and a Half per Cent. War Loan stock. Expenditure on tree planting for the year amounted to £136. The total area now planted is 83 acres, but a further area of 130 acres has been prepared for planting during the ensuing season.

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Village Main Reef.

During the quarter ended September 30th, the profits earned by the Village Main Reef amounted to £71,025; ore received from mine, 110,478 tons; waste sorted out, 14·9 per cent.; tonnage crushed, 94,060 tons; number of stamps operating, 160 stamps; number of tube mills operating, 4 tube mills. Value of ore before crushing (reflected by mill yield and value of pulp):—Mill yield per ton, 23s. 6d.; assay value of pulp, 11s. 8d.; total, 35s. 2d. (The values per ton are calculated at 84s. per fine ounce). Total yield, 38,806 ozs. fine; total yield per ton, 34s. 5d. Owing to unforeseen conditions created by the war, the amount previously allowed for realisation charges on gold has proved to be insufficient. A further allowance has now been provided by reduction from the value of gold produced, particulars of which are shown in the working expenditure and revenue account. Operations proceeded normally until the 28th September, when a heavy fall of rock took place, resulting in serious damage to the vertical and incline shafts between the 9th and 10th levels. Repair work was taken in hand immediately and is steadily proceeding. Various modifications will be necessary in the method of dealing with ore from the bottom of the shaft and a new cross-cut and ore pass will be made. Hauling from bottom of mine was resumed on 27th December, and hoisting conditions should be normal in a few days. Owing to the small tonnage milled during the current quarter a loss will be incurred.

Natal Coal Outputs.

In November the collieries of Natal mined 217,069 tons of coal, as compared with 167,898 tons in November, 1914. The average number of whites employed was 493 (as against 472 a year back). There were 3,278 Asiatics and 7,286 natives employed. The coal bunkered at Durban was 86,221 tons; 32,491 tons were exported Overseas and 8,093 to Union ports.

TOPICS OF THE WEEK.

MINING QUESTIONS FOR THE NEW YEAR.

Despite the excellent Rand mining outlook for the year—the appreciation of which seems to have created something of a boom in sharemarket circles—there is no lack of questions of what may be termed a domestic industrial nature awaiting consideration. Miners' phthisis is, unfortunately, still a serious preoccupation; small holdings for miners are—as a result of the adjourned debate in the Assembly—engaging the study of our legislators in the leisure of the recess; and the opening up of the Far East Rand falls to be considered in the early future. Apart from the big issues connected with the war and the German East expedition, it will be seen that there is here enough to keep our legislators and administrators busy preparing for the next session. A vast amount of information is, of course, available on all these subjects—in the form of Blue-Books and reports; and the Mines Department, the Chamber of Mines and various committees are known to be busy in sifting and marshalling the evidence. The questions of phthisis and small holdings are, of course, intimately connected, and the following circular has been issued by the Phthisis' Compensation Board to beneficiaries under the Act: "For the information of the Honourable the Minister of Mines, I shall be much obliged if you will kindly notify at foot of this letter whether your present occupation is farming, the extent of ground you are on, the farming implements, with the stock that you possess, and any other particulars of this character you wish to give. This letter, with the information asked for, should be returned (addressed envelope enclosed) by you at once so that it may reach this office before the next monthly payment is due to be remitted to you.' The circular is signed by Mr. J. L. van der Merwe, Chairman of the Miners' Phthisis Board, and the schedule at the foot indicates clearly the nature of the information required. The latest evidence on miners' phthisis collected by the Chamber of Mines and the Phthisis' Prevention Committee will doubtless be published by the Select Committee which starts taking evidence on the Rand next Monday, and comment must be deferred until that evidence is available. In regard to small holdings, it is expected that the whole matter will once more be threshed out when Parliament meets again in the light of the fuller study now being given to it. The future of the Far East, likewise, requires more extended consideration in the light of all the facts. In this connection it may be of interest to quote some remarks made by Sir Lionel Phillips last year, that seem apropos of the Socialist and recent Nationalist proposals to dispose of the Far East areas. "Apart from other sources of prosperity and revenue," said Sir Lionel, speaking at the Central Mining meeting, "the Union Government possesses large areas of mining ground, particularly on the Eastern side of the Witwatersrand, the working of which is of the utmost importance to the Union. The gold-bearing beds are known to exist over a very large area, but unfortunately they lie mostly at a great depth from the surface, and therefore immense capital outlay will be necessary for their exploitation. If the yield per ton could be determined without an expenditure of large sums upon shaft-sinking, the position would be simple, but unfortunately in the locality referred to gold is known to be somewhat partially distributed, that is to say, within the large area referred to, which comprises something like 80,000 claims, there will no doubt be some rich mines, there will no doubt be also some totally unpayable mines, and the discovery of which are payable and which are unpayable can alone be determined by sinking shafts. Boreholes, particularly in that locality, appear to afford rather illusive results. They determine the presence of the ore body, but do not give any reliable information as to its value. It will therefore be necessary for the State to offer exceptionally favourable terms to those who are ready to risk the outlay of large sums which may be entirely lost, and it is only by the possible discovery of an occasional prize that the venturesome will subscribe their money for the possible disappointment of a blank. Moreover, from the standpoint of the State, it is of infintely greater importance to provide work for a large number of persons, to attract, indeed, a larger population, and to secure all the benefits of increased industry, than any share in the profits from Crown land which it might obtain. The general profits tax of to-day and the special revenue derived by the Government from Crown property are, of course, important items in the revenue, but they are, I believe, infinitely less important to the progress of the country than the collective value of customs, railways, and other contributors to the State coffers which is provided by a large population and by the initial State charges upon machinery and plant requisite for the opening of new mines as well as the continuous income which the working of those mines produces." In these remarks, the whole argument against nationalization of the mines is indicated, and they may be worth remembering, should ever the Nationalist proposals take serious form.

THE DIVIDEND POSITION.

The declaration of dividends amounting to £7,617,561 for the year 1915 by the producing gold mines of the Rand marks a lower level than has been reached since 1907, when dividends amounting to £6,922,420 were declared, followed by £8,536,773 in the following year. Since then the lowest declaration for any one year, until now, was that of £7,763,086 in 1911. It has to be remembered, of course, that many unusual difficulties have beset the mining industry since the beginning of the war, and, in view of this fact, it must be admitted that the results of the past twelve months have not been unsatisfactory. The standing of the individual dividend-paying companies cannot, naturally, be judged from the rate of their declarations. The sharemarket has a way of discounting these things which may appear to be based upon some sort of guess-work, but it will be found, upon investigation, that the estimate placed upon shares on the Stock Exchange usually bears a fairly close approximation to their proper speculative value. Taking the highest local declaration for the year, that of the Meyer and Charlton, amounting to an 80 per cent. dividend, together with a bonus of 50 per cent., which brings the total distribution to the magnificent sum of 130 per cent., it will be seen from the share list that buyers are asking for a return of as much as 13·91 per cent. on their money, on the dividend basis of 80 per cent., and as much as 22·6 per cent. on the basis of 130 per cent., which includes the bonus. Allowance has to be made for amortization, of course; but with a life of anything over 17 years, as has been commonly estimated for this company, the proportion of the dividend to be set aside for this purpose leaves a fairly high return. It is evident, therefore, that the Stock Exchange does not regard the unusually high milling returns of the Meyer and Charlton as being of a settled kind. A few other companies that might be mentioned, also, as being bought to return a somewhat high rate of dividend are the Consolidated Langlaagte at about 14¼, the Knights Deep at the same figure, and the Van Ryn at 16 per cent. All of these, it will be noted, are well above the 10 per cent. return, which, in ordinary circumstances, is considered a fairly satisfactory rate. Some of the highest-priced shares, from the point of view of the dividends declared for the last twelve months, are to be found in the further East Rand. Geduids, for example, have been quoted lately at a figure which would return as low as 5·79 per cent., with the dividend rate as 10 per cent. Modder Deep, again, has been quoted to yield 6·22 per cent., New Kleinfontein 7·40, and New Modder 8·25 per cent. on the dividend. The City Deep stands higher on the list, with a return on the dividend of 9·18 per cent. The following list, taken from among those concerns for which quotations were published in December, will be interesting and instructive:—

Company	Price.		Dividend for 1915 per cent.	Yield on Quoted price.
Nourse Mines	20	0	10	10·00
Crown Mines	61	0	65	10·65
Van Ryn Deep	58	6	32½	11·11
Modder B	120	0	67½	11·25
East Rand Prop. M.	20	0	11¼	11·25
Brakpan Mines	66	0	40	12·12
Village Deep	35	0	21¼	12·14
Luipaardsvlei Estate	6	0	3¾	12·50
Consolidated Main Reef ...	19	9	12½	12·65
Meyer and Charlton	115	0	80+50	13·91
Consolidated Langlaagte	35	0	25	14·28
Knights Deep	21	0	15	14·28
Van Ryn	50	0	40	16·00

Of these, Nourse Mines were quoted at the beginning of last year to yield about 14·75 per cent. on the 1914 dividend basis, Meyer and Charlton about the same, and Consolidated Langlaagte and Knights Deep about 11·90 per cent. Among the others the variation in price has not been so great. Since the estimated lives of all these mines is not such as to make the question of amortization one of any great moment, it appears that the public requirements in the matter of interest are not altogether on the small scale as far as most of the representative mines on the Rand are concerned. From the speculative point of view, in other words, there seem to be opportunities at current prices, which are well worth considering. In order to complete the analysis of the dividend returns, various deductions to be made on account of amortization of capital may be shown. We do not accept any responsibility for the lives given in the list, inasmuch as, generally speaking, they are unofficial. They are merely approximate estimates, which have been made by persons who have used all the information publicly available, and are frequently published in a contemporary for sharemarket use. Those who have better information may make the necessary allowances for themselves:—

Company	Life.	Dividend rate per cent.	Rate on Purchase less Amortization per cent.
New Kleinfontein	25	10	4·66
New Modder	22	32½	4.98
City Deep	36	33¾	7·60
Nourse Mines	26	10	7·41
Crown Mines	50	65	9·76
Van Ryn Deep	27	32½	8·65
E.R.P.M.	35	11¼	9·60
Modder B	68	67½	11·00
Brakpan Mines	30	40	10·02
Village Deep	23	21¼	9·06
Luipaardsvlei Estate	24	3¾	9·60
Con. Main Reef	70	12½	12·40
Meyer and Charlton	17	80 + 50	9·32
Consolidated Langlaagte	34	25	12·55
Knights Deep	14	15	8·43
Van Ryn	15	40	10·62

THE WAR AND THE UNION PORTS.

Without discussing the deplorable doings of enemy submarine pests, which are causing some diversion of Eastern shipping from the Suez Canal to the Cape route, it may be of interest to recall the pertinent and prophetic words of the Dominion Royal Commission on the subject. The fact that the report of that body on South Africa dealt mainly with the mining industry obscured its references to the question of Union ports and shipping. "Situated as the Union is half-way between England and the other Dominions of the southern hemisphere," said the report, "and on a sea route to India which is the only alternate to that by the Suez Canal, its harbours have, in an especial degree, an Imperial interest." Before the war broke out about 75 per cent. of the total outward traffic from the United Kingdom to Australia and New Zealand, and 32 per cent. of the homeward traffic passed by way of the Cape of Good Hope. Nevertheless the respectable total of 1½ million tons passed through the Suez Canal en route between Europe and Australia. "If in past years, when only vessels of 26 feet draught could pass through the Suez Canal," said the report, "the South African authorities had realised the advantages which deep-water harbours could have given them, it is certain that the proportion of traffic using the route via the Cape of Good Hope, high as it is, would have been substantially increased." Therefore the Commission urged the wisdom of a bold future policy. Without going into the rival merits of the Union ports and into those of Delagoa Bay for the purpose of local traffic and local development, the Commission declared that "the improvement of Capetown and Durban to the level of first-class harbours is in the interest both of South Africa and of the Empire." Jealousy between these two harbours was deprecated. They "should be regarded less as rivals than as jointly interested in improving the South African route, and in attracting to it all the traffic available." At the same time, in the case of Capetown, we were told that "the work of improvement has real urgency in view of its geographical position." As matters stand, to judge by the evidence of witnesses quoted by the Commission, "real urgency" is likely to be interpreted in a somewhat leisurely fashion. It seems that "extensions immediately in hand" are expected to provide accommodation in 2½ years for ships—how many is not said—drawing 36 feet 6 inches: while a scheme has been "prepared and submitted to Government involving the expenditure of some £3,000,000, spread over 10 years, and the construction of eight berths with 40 feet of water." As to Durban, mention was made of a project "by means of reclamation work to provide 14 berths, each with a depth of 40 feet." No figure of cost was given: but the provision of a 40-feet channel to the 40-feet berths was estimated to cost two millions sterling. The returns of the last few years before the war showed that the number of vessels calling at Durban was rapidly increasing. It rose from 274 in 1912 to 370 in 1913. It is not clear, however, that the need for deep harbour accommodation is greater at Durban than in Table Bay; for the tonnage of the 315 vessels which called at Capetown in 1913, was greater than the tonnage of the 370 vessels which called at Durban. The Commission said nothing about the proposed expenditure of 1½ million sterling on a breakwater at Port Elizabeth: but we may infer what their opinion would be from their remark that nothing which would possibly be done at any of the other harbours of the Union, or at Delagoa Bay, would have the same effect as the speedy provision of deep-water accommodation at Capetown and Durban in attracting to South Africa traffic which, in the absence of such facilities, must otherwise be lost to it. As regards the mail steamers, the Commission observed that the contract for the carriage of South African mails compared favourably with other mail contracts, though greater speed were desirable, and the advantage of the subsidy system was countered by serious drawbacks. In any case the development of the harbours in such a way as to attract the big Australian liners could not be otherwise than useful. It is odd, as the Commission remarked, that "the transport of mails between England and South Africa has been organised hitherto as if Australia and New Zealand did not exist, and the mail service between England and Australia and New Zealand organised as if South Africa did not exist." This though the direct route from the United Kingdom by way of Table Bay to Adelaide is only 600 knots longer than that by Gibraltar and the Suez Canal. It was suggested that in all future mail contracts affecting either Australasia or South Africa it would be advantageous if there were consultation, not only between the British Government and the Dominion Governments, but between the Dominion Governments themselves.

THE EAST RAND.—III.

The Bird Reef Amygdaloid —A Valuable Marker—The Kimberley Shale Horizon.

[From Dr. E. T. Mellor.]

The value of "markers" in the work of correlating Witwatersrand strata is probably more apparent in the East Rand than in any other area along the line of reef, and Dr. Mellor draws attention in this connection to the well-known amygdaloid, which is associated with the Bird Reef zone.

> In the far East Rand, in borehole sections which intersect the Main Bird Series, reefs of the Bird group appear to be always sufficiently in evidence to figure in the records. They occur over a thickness of from about 200 feet in the north to about 80 or 100 feet in the southern portion of the area, and are very generally grouped more conspicuously at the top and bottom of the zone which they cover, the lower band being perhaps the stronger of the two. This is frequently named "Modderfontein Series" in borehole records, but it lies far above the horizon which would correspond to that of the Modderfontein or Livingstone group of reefs in the better-known portions of the Rand, including Modderfontein. The latter group is also represented in the far South-Eastern Rand, but appears to be as a rule very feebly developed, consisting of a few small bands of grits or very small-pebbled reef. Occasionally, however, borehole records show a strong development of more pronounced conglomerate bands at this horizon, so that the group must be very variable in character, and is consequently of little value for correlation purposes. One of the most important "markers" over the whole Eastern Rand is undoubtedly the Amygdaloid sheet which lies close above the Bird Reefs, and might well be called the Bird Amygdaloid. In the extreme east and and south-east the amygdaloid frequently lies directly upon the uppermost conglomerates of the Bird group, while coming towards the Central Rand it is separated from them by a constantly increasing thickness of quartzite. In the neighbourhood of Daggafontein Mine the thickness of the amygdaloid attains 250 feet, diminishing towards the north and west. Borehole sections frequently show a much greater thickness of igneous rock about the horizon of the amygdaloid than the normal for that sheet. In some cases this appears to be probably due to a subsequent intrusive sheet having followed the amygdaloid horizon, but in others it is most probably to be accounted for by a dyke having been passed through in the immediate neighbourhood of the amygdaloid. The fact that the amygdaloid itself may be devoid of amygdales over a large portion of its thickness, and that the cores of the holes are in many cases no longer accessible, renders an exact explanation of such cases impossible. Faulting of a simple kind frequently met with in the area may also obviously bring about an apparently abnormal thickness of amygdaloid in a borehole section, as also it may equally easily eliminate the amygdaloid from any particular hole altogether. The small importance attached to the occurrence of an amygdaloid at the time the boring was done probably accounts for its not being recognised in some of the earlier records, although a rock resembling the amygdaloid in appearance is mentioned. This appears to be the case in a borehole on the Nigel Deep, in which no amygdaloid appears between the horizon of the Kimberley Shales and the shales below the Nigel Reef, at least in the record. Numerous other boreholes, however, in the same locality show a normal occurrence of amygdaloid at the usual horizon, and the rock has been intersected in many shafts in the Sub-Nigel Mine, and shows a thickness for this locality of about 210 feet Since sheets of amygdaloid occur at several horizons, the mere intersection of a rock of this type is of little value in itself as a determining horizon. The usual threefold combination of the amygdaloid just referred to with a well-marked group of conglomerates like the Bird Reefs, and of these again with a considerable thickness of argillaceous beds like the Kimberley Shales, affords, however, an extremely valuable means of correlation in borehole sections in the basin of the far East Rand.

The Kimberley-Elsburg Series.

The following detailed description of a group of reefs, which seem to be a source of confusion to many prospectors in the further East Rand basin, is well worth quoting at some length:

> The *Kimberley Shales* are well developed throughout the Eastern and far Eastern Rand, showing much less diminution in thickness as compared with the central area than is the case with the coarser members of the series. They form one of the most important means of correlating borehole sections, although greater stress has been frequently laid upon the occurrence and character of the much more variable conglomerate horizons. Probably a more correct idea would be obtained of the structure of the eastern basin by constructing a contoured plan of the Kimberley Shale throughout that area than by confining such contouring to the horizon of the "reef," as is very frequently done. In many instances by the time a borehole has penetrated the Kimberley Shales its inclination from the vertical has become so considerable that in the absence of a really reliable survey, which is never very easily obtained, and in many instances does not exist at all, very considerable difficulties may arise in the estimation of the true depth of the hole, a point which will be again referred to below. The *Kimberley Reefs* have been intersected in many boreholes on the far East Rand, where, although perhaps not so strongly developed as in the centre and west, especially as regards the thickness of individual reefs and the maximum size of the pebbles, they are very well represented. As already pointed out, the gradual thinning of the quartzites, which on the Central Rand are almost invariably present between the Kimberley Reefs and the shales below, results in the lowest pebble-band coming to lie directly upon the shales. Such a reef may therefore have a shale footwall, and, as it may also give very encouraging assays, it invites identification with the Van Ryn or Nigel Reef—*i.e.*, with the Main Reef Leader horizon. In most instances the number, size and character of the reefs found associated with it would be at once sufficient to suggest its membership of the Kimberley group, since nowhere are so many reefs found above the Main Reef Leader as are usually met with in such cases. Towards the extreme eastern margin of the East Rand basin, however, where a borehole may possibly intersect only the lowest portion of the Kimberley group of reefs, it is not always possible to apply such means of identification. In numerous instances in the eastern basin notable values have also been found in well-developed reefs at a little distance above the top of the Kimberley Shales. One of the best-known examples which frequently presents a very promising appearance at the outcrops is the well-known "*Joel Reef*," which can be followed at the surface for considerable distances in the neighbourhood of the Sub-Nigel Mine. Its position with regard to the Kimberley Shales is there quite clearly shown, leaving no room for doubt as to its stratigraphical position. The *Elsburg Reefs* have been more or less denuded from the greater part of the eastern basin, but a complete section, together with the overlying amygdaloid, is still represented in a portion of the area lying above the axis of the main syncline, as, for example, in the neighbourhood of the farm Vlakfontein 26. Compared with the Central Rand, the Elsburg Reefs in this district are much less conspicuously developed, and the average and maximum size of the pebbles is much smaller, so that the reefs conform more in this respect to those of the Main Reef Zone. Some of the most conspicuous reefs occur not far below the junction of the top of the series with the amygdaloid, and are very abundant in the first five hundred, and particularly the first hundred, feet below that horizon. Pebbly bands are, however, of frequent occurrence throughout the quartzites between the main groups of Elsburg and Kimberley reefs as in other parts of the Rand, and the similarity between the Kimberley and Elsburg portions of the series is perhaps even greater than in the central area.

Some Practical Considerations.

It is pointed out that the doubt which frequently prevailed with regard to the horizons actually intersected in many cases in the Far East Rand has led to a good deal of unnecessary work. In the complete paper by Dr. Mellor, to be published at a later date by the Geological Society of South Africa, some useful diagrams, based upon the data of these boreholes will appear, and it is hoped that they will prove of great assistance to those who are engaged in exploratory work in that neighbourhood:

> The circumstances which appear to have most commonly led to doubt as to the particular horizon reached in various holes have been the frequent absence of anything like a well-defined reef at the horizon of the Main Reef Zone, and the presence in many instances of a well-developed reef, occasionally yielding encouraging assays either immediately upon the Kimberley Shales or at no great distance above them. In the former case reluctance to accept an unfavourable result frequently led to a continuance of the boring far beyond the usual horizon; in the latter the promising appearance of the reef encountered and its association with a shale footwall were frequently the grounds of its acceptance as the reef sought for, from which in other respects it offered many points of difference. Where, however, a sufficient thickness of beds has been intersected before the Kimberley Shales are reached, the number and size of the reefs met with above the shales would leave little doubt of their belonging to the Kimberley group. It is extremely rare to find even a few inches of quartzite between the true reef horizon on the Eastern Rand and the slate footwall, and the occurrence of any large numbers of well-marked pebble bands within a short distance above that horizon is also of very rare occurrence. In a covered area like the far East Rand we are dependent for our estimates of the local thicknesses of various portions of the Witwatersrand System largely on boreholes, which do not always show very consistent results. . . . . One well-known hole to which such considerations apply is the Grootvlei-Daggafontein Joint Borehole. This hole is regarded as one of the most important on the far East Rand, and an inspection of the contoured plans of the reef horizon pub-

lished with the papers of Drs. Hatch and Henderson, as well as the similar plans which have been constructed by other engineers, shows that the data furnished by this hole have had a considerable influence in the laying out of the contours, the hole being usually shown as a centre, around which the deepest contours have been drawn. The true depth of the hole is not known, as it was found impossible to survey the lower portion, and the depth of the reef given for this hole, 4,880 feet, is based upon the assumption that the inclination from the vertical in the lower portion is only 30°. The thickness given for the beds between the Bird Reef Amygdaloid and the foot-wall shales measured along the course of the hole is 916 feet. On the other hand, the true thickness would appear from the data derived from other holes and shafts in that neighbourhood to be approximately 600 feet. Assuming, as is most probable, the beds to be but slightly inclined, and that no serious faulting occurs, the difference between these figures would indicate that the borehole traversed the beds in question at an angle of about 50° to the vertical, an inclination which seems probable enough from the depth of the hole and the surveys given of its upper portions. This deduction appears to confirm the opinion expressed in the reports on this hole that it had a greater inclination than that upon which the estimate of 4,880 feet for the depth of the reef at this point was based. The fact that a lesser inclination involves the supposition that the hole, after diverging considerably from the vertical, again approached more nearly to it, appears further to confirm the view expressed above, since the return of a borehole towards the vertical is extremely unlikely, judging from a large number of surveys of which we have records. It seems probable, therefore, that the horizon of the Main Reef Zone in the far East Rand may lie at a much more accessible depth in some localities, including the borehole referred to, than that usually attributed to it. On the other hand, at other points the depth may be greater than is sometimes assumed to be the case. Thus the disposition of the amygdaloid on Vlakfontein 26 and the known position and dips of the top of the Elsburg beds to the north and south indicate that the main axis of the East Rand syncline must pass very nearly across the middle of that farm, and that the depth of the Main Reef Zone on the axis of the syncline about the common boundary of Vlakfontein and Grootfontein probably exceeds 6,000 feet, diminishing both to the north and south and increasing as the axis is followed in a westerly direction. The depth which has been attributed to the slate foot-wall of the Main Reef horizon in the locality referred to more probably represents that of the top of the Kimberley Shales.

THE DISPOSAL OF THE FAR EAST RAND GOLD AREAS.

Nationalist Party's Petition to Parliament in Regard to Nationalising the Mines.

The Nationalist Party is promoting the following petition to the Government asking for the nationalising of Government mining areas on the Far East Rand.

To the Honourable Speaker and the Honourable Members of the House of Assembly.

The petition of the undersigned inhabitants of the Union of South Africa humbly sheweth :—

1. That your petitioners desire to direct your attention to the fact that there are about ninety thousand gold claims on the East Rand.

2. That most of these claims are of a highly payable value, as proved by mining and producing gold mining companies immediately adjoining the said claim areas.

3. That the said claims are thus of an enormous value, and that the Government of the Union have full control of disposal over the said claim areas.

4. That the Union Government has already leased some two thousand odd claims, the ground being known as the Government Mining Areas, to the Johannesburg Consolidated Investment Company, Ltd.

5. That on the 7th of December, 1915, in Parliament the Honourable the Minister of Mines, replying to a question by Captain Rennie, is reported to have said : " The Government was considering the question of offering further areas of mining ground on the East Rand for lease under Section 46 of the Gold Law."

6. That it is obviously clear from development results that the said company will make large profits and that the Government will secure only a certain percentage of the profits of the said company.

7. That your petitioners consider—on the advice of mining engineers of high standing—that some, if not most, of the said claims can be worked by the State direct at a very considerable profit.

8. That the Government is in a position to appoint as competent and efficient an engineering staff as any of the existing large mining corporations, and that the Government, with an asset of such enormous intrinsic value, would have no difficulty in raising the necessary capital for development and equipment.

Wherefore your petitioners humbly pray that your Honourable House will take the necessary steps to reserve intact for the State the said claim areas, and when circumstances permit it that the Government shall develop and exploit the said areas or portions thereof for the benefit of the State, whereby the State would derive the full advantage of this great national asset. Should your Honourable House not agree to Article 7 of this petition, then in the alternative we pray that it shall be an instruction from your Honourable House to the Government that " any contract entered into in accordance with Article 46 of the Gold Law, Section 2 (c) shall, before having any validity or binding force, be laid before Parliament for its approval. It is conscientiously felt by your humble petitioners that State-worked mines would create employment for thousands of white miners who would be enabled to earn a fair living wage." Thousands of native labourers, too, would secure employment, and these benefits would in turn conduce to a state of prosperity within the Union. Also that out of the profit accruing to the Government out of the State-worked mines it would become possible for the Government to provide funds for (a) other productive and reproductive works, irrigation, factories, industries; (b) part repayment of our enormous national debt; (c) the decrease of further taxation, and your petitioners as in duty bound will ever pray.

PERSONAL.

Mr. B. Madew has returned to the Rand.

* * * *

Mr. H. Warrington Smyth, the Secretary for Mines, has been appointed a temporary supernumerary Lieutenant in the Royal Naval Volunteer Reserve, South African Division.

* * * *

In reference to our " Personal " par in our issue of 1st inst. re Mr. J. N. Bulkley, it should be made clear that Mr. Bulkley was Consulting *Electrical* Engineer to the General Mining Corporation, and *not* Consulting *Mechanical* Engineer, that appointment having been held by Mr. E. Farrar during the whole of Mr. Bulkley's connection with the group.

* * * *

The following is a list of the certificates issued by the Mines Department for the period ending 31st December, 1915:—Mine Surveyors' Certificates: W. S. F. Cameron, W. P. Evans, J. S. Hutt, L. V. Melvill, T. J. R. Richards, W. E. Sinclair. Mine Overseers' Certificates: R. Bawden, J. J. Bennett, D. M. Brain, R. E. A. Dixon, H. W. Hancock, C. L. Lamb, B. H. Lindhorst, L. M. Nesbitt, S. Nettleton, W. Pearson, C. H. Sage, P. F. Smithwick, C. A. Strahlman, W. Tarran, A. v.d. B. van Velden. Engineers' Certificates: Mechanical (Mines): W. Badger, A. N. H, Bedborough, E. H. Boyce, E. T. M. McChesney, W. Mowat, R. W. Nisbet, E. V. Perrow, (Works) S. J. Smith; Electrical (Mines): F. A. Knott.

* * * *

It was stated at the last meeting of the Chamber of Mines that Mr. A. W. Stockett, who had been connected with the mining industry for many years—latterly as one of the technical advisers to the Chamber—had retired and left the country for America. Mr. Stockett, said the President (Mr. W. H. Dawe), had rendered valuable services to the industry, especially in connection with the recent revision of native labour complements, and the Committee had taken the opportunity of his retirement to present him with a token of their esteem and appreciation.

FERREIRA DEEP, RESULTS AND PROSPECTS.

Net Profit, £463,582—Effect of Earth Tremors on Operations—Satisfactory Labour Position.

The working profit earned by the Ferreira Deep for the year ended September 30th last amounted to £455,933 5s. 2d. after providing £8,402 as a further allowance for increased freight and insurance of gold from mid-October, 1914, to 31st August, 1915, due to the war. This additional cost has been provided for in the value of gold declared since the latter date. To this amount of £455,933 5s. 2d. has been added the difference between certain items of sundry revenue and expenditure detailed in the working expenditure and revenue account, amounting to £7,649 0s. 0d., making a net profit of £463,582 5s. 2d. This sum, together with the balance of appropriation account at 30th September, 1914, viz., £366,195 12s. 7d. and £4 2s. 10d. in respect of forfeited dividends, making a total of £829,782 0s. 7d., has been dealt with in the appropriation account as follows:—Expended on equipment, £2,013 7s. 3d.; Government taxes, including this company's estimated proportion of the special war levy, £59,355 10s. 6d.; bonus dividend, £245,000; interim dividends, Nos. 25 and 26, £416,500; making a total of £722,868 17s. 9d.; leaving a balance unappropriated, represented by cash and cash assets, less all liabilities, of £106,913 2s. 10d. The directors' report further states: Operations for the year have been adversely affected by collapses of portions of No. 2 incline shaft, coincident with heavy earth tremors. Particulars were published in the Press, and were given in the quarterly reports issued by the Board during the year. The matter is also dealt with fully by the Consulting Engineer and Manager in their reports. The work of reorganising the hoisting is well in hand and is expected to be completed during the current financial year, at an estimated cost of £30,000, which will be provided out of current profits and charged to working expenditure. The native labour supply at present is satisfactory and sufficient to meet the company's requirements.

Consulting Engineer's Report.

The Consulting Engineer, Mr. Percy Cazelet, in his annual report writes: The scale of operations for the year under review has been very materially less than in the immediate past owing to two serious collapses of No. 2 incline shaft in December and April respectively, each following on severe earth tremors. Besides adding the actual cost of repair to the working expenditure, these collapses decreased the output and increased the cost per ton to such an extent as, together with a further decrease of 2s. 9d. per ton in yield, to bring down the working profit earned from £650,702 in 1913-14 to £455,933 for the year under review. In spite of the above-mentioned interruptions a record tonnage hoisted was produced by the two Deep shafts. The earth tremors which have been experienced in this section of the Central Rand for some years have more latterly spread their effect over a larger area, and neighbouring mines have also suffered with the Ferreira Deep as a consequence. It is satisfactory to note, however, that in spite of there having been some very heavy tremors experienced during the last few months, which caused serious shaft damage on a neighbouring mine, no actual damage has been sustained in your mine since May last until the 8th inst., when some minor damage was caused, which only delayed hoisting for a few days. It having become evident that should No. 2 incline suffer further serious collapse from these tremors, it might prove impossible to again repair, the reorganisation of hoisting in this shaft was sanctioned in June last, and a good start has already been made with the necessary work. This consists of carrying down the vertical portion of the shaft from above the 2nd level, where the "bend" now starts, to below the 7th level, on the plane of which latter a crosscut is being brought from the incline shaft to the deepened vertical; along this crosscut the ore hoisted in the incline will be transferred to be re-hoisted in the vertical. This work will admit of the elimination from the scheme of hoisting of the "bend," connecting the vertical and incline portions of the shaft and of the whole of the damaged portions of the incline between the 2nd and 6th levels, and should be finished and in use during the current financial year. The cost of this work is estimated at about £30,000, and is being met currently out of working expenditure. Had these difficulties coincided with the time of the worst labour shortage, the effect on the results now presented would have been less serious, but it is satisfactory that the labour position has latterly become much better and the mine has at the present moment sufficient labour to crush at its full capacity, whilst at the same time breaking excess ore and storing this on surface to help against any period of shortage in the future. The outcrop claims are now practically exhausted and work therein has almost ceased, but the outcrop shaft is being kept in commission to help in the handling of the company's natives to and from their work, and as a reserve in case trouble is again experienced in the Deep shafts. Reef-packing has been maintained as the system of support in the current stopes throughout the mine, and has proved so successful that, in spite of the troubles experienced in the shafts and of collapses of drive pillars, no trouble or anxiety has been experienced at any time during the year in the stopes, as was common in the past. It is satisfactory to note that this system of stope support is being gradually introduced into other mines in the neighbourhood as these begin to experience the effects of "weight." The tonnage of broken reef packed during the year has amounted to approximately 98,400 tons and that withdrawn from packs to 81,500 tons, leaving an amount of approximately 194,400 tons in the mine used as temporary support for the workings. The cost of breaking and packing this ore has been met entirely out of working profits. The development work accomplished shows a slight increase over that of the previous twelve months, but this must decrease appreciably during the remaining life of the mine, but little ground still remaining to be opened up. Every effort has been made to expedite all necessary development work well in advance, and but for the few claims situated to the south of the Grahamstown dyke the bulk of this work has now been accomplished. For the purpose of opening up these few claims a large-section crosscut has been put in on the 12th level, which has given access to the South Reef to the south of a big down-throw fault situated just through the Grahamstown dyke. Another crosscut has been commenced on the plane of the 15th level to tap this same ground, through which the whole of this area between the 12th and 15th levels will be exploited, after connection by means of winzes which have been already commenced. But little shaft sinking remains to be accomplished, as it has been decided that only as much more sinking will be carried out as will allow of convenient hoisting arrangements on the 15th level, which work should be completed during the current year. The triangular piece of ground remaining below this point, which is bounded by the Grahamstown dyke on the south-east and by the Robinson Deep boundary on the south-west, will be exploited by means of winzes and small winches. The comparatively good values met with during the preceding year in the eastern ground again held good, and on the 12th, 13th, 14th and 15th levels in the No. 1 (East) shaft area the Leader exposures remained satisfactory; the decrease in the value of the Leader exposures as a whole for the year, when compared to those of the previous year, is due to the lesser proportion of work done in the rich western area, which is now nearly completely developed. South Reef values have also been good throughout, even those south of the Grahamstown dyke proving better than might have been anticipated from the exposures near-by in neighbouring properties. The large area of low values met with between the 7th and 11th levels on Leader east of No. 1 shaft, however, has shown no better results, but this area will be further prospected when the other more necessary development is completed. The ore reserves have been recalculated as at September 30th, 1915, and amount to the following:—Leader (outcrop section), 29,200 tons; value, 6·7 dwts., 28s. 9d.; (deep section), 1,040,500 tons; value, 8·4 dwts., 35s. 3d.; South Reef (deep section), 784,400 tons; value, 8·4 dwts., 35s. 3d.; total, 1,854,100 tons; value, 8·3 dwts., 35s. The estimated stoping widths over which the reserves are based are 73 inches for Leader and 57 inches for South Reef, as compared with 78 ins. and 57 ins. respectively at last revision. A reduction of 39,000 tons and 0·2 dwts. in value is shown as compared with the reserves of last year. Of the above reserves some 576,900 tons, with a value of 8·6 dwts., cinsisting of shaft and boundary pillars, are temporarily unavailable for stoping. The 194,400 tons of ore in reef-packs already mentioned, as used for the temporary support of the hanging wall in the current stopes, are additional to the above reserves. There are still some 600,000 tons of Main Reef, estimated to be worth about 3·7 dwts. in value, in the footwall of the Leader stopes at the western end of the mine. With the present range of costs, and while the mills can be kept busy on better value rock, this ore is not of much immediate utility, but later in the life of the mine, when the richer ore is exhausted and should costs show some further reduction, it is probable that considerable advantage may be gained from the mining of a portion at least of this ore. The completion of the main pumping station on the 12th level at No. 1 shaft and the increase in the capacity of the higher station on the 2nd level, which work was completed during December last, have resulted in giving much more freedom from anxiety as to the pumping position and must have reduced the cost of pumping appreciably. It is not possible this year to give any detailed comparison of costs with preceding years, owing to the difference of form in which the accounts are this year presented, but there is shown an overall increase in costs of 2s. 2d. per ton, the reasons for which have already been stated. The lower grade of ore treated was in great measure due to the gradual transfer of stoping operations from the richer wide areas in the west of the mine to the poorer areas in the east as the former approach exhaustion, and also to some extent to the mining of the lower grade South Reef in a proportion greater than that in which it appears in the reserves; this was and yet remains advisable so as to allow of the relief of unnecessary stress from the Leader stopes and the roof of No. 2 shaft by the previous removal of the overlying South Reef, which has a comparatively good and elastic hanging.

MANAGER'S REPORT.

The Acting General Manager, in his annual report, writes *inter alia*:—The practice of supporting the hanging wall in the stopes by means of packs of broken reef was continued throughout the year with satisfactory results; 98,366 tons of reef were packed, and 81,453 tons were taken from packs during the year. No. 2 shaft incline collapsed near the 5th station on the 2nd December, 1914, and again at practically the same place on 19th April, 1915. With the first smash 28 days' hoisting time was lost, and a further delay of 58 days was caused by the second smash; on each occasion the accident was coincident with a heavy earth tremor. The condition of the incline was found to be so bad after the second interruption that it was decided to reorganise the hoisting in this shaft. This work is being pressed at the maximum speed, and it is hoped that it will be completed in time to avoid further serious hoisting delays. The tonnage hoisted through the old Ferreira shaft fell from 137,831 tons in the year 1913-14 to 48,718 tons during the year under review. The hoisting of ore through this shaft will be discontinued within the next few weeks; but the shaft will still be used for the transport of natives, until the new work at No. 2 shaft is completed. Notwithstanding the two serious delays, caused by the collapse of No. 2 incline, the tonnage of ore hoisted through the deep shafts amounted to 636,586 tons, as compared with 613,272 tons during the previous year. Working costs per ton milled were 19s. 8d. as compared with 17s. 6d. for the previous year; much of the increase can be directly accounted for by the troubles at No. 2 shaft, and a large portion of the remainder is owing to the increased cost due to the war. The recovery value dropped from 37s. to 34s. 3d., which is largely due to the mining of a greater proportion of ore from the eastern section of the mine than formerly. The following figures show roughly at a glance the effect which the increase in the tonnage from the eastern section of the Deep mine had on the grade:—Year 1913-11: No. 1 (east) shaft, 240,878 tons; 6·8 dwts.: No. 2 (west) shaft), 372,394 tons; 9·9 dwts. Year 1914-15: No. 1 (east) shaft, 352,707 tons; 7·5 dwts.; No. 2 (west) shaft, 283,879 tons; 9·2 dwts. Totals—Year 1913-14: 613,272 tons; 8·7 dwts.; Year 1911-15: 636,586 tons: 8·2 dwts. It is expected to further increase the percentage from the eastern section during the current year. Development operations for the year continued as usual; the total footage accomplished being 10,547 feet, as compared with 10,125 feet during the previous year. No. 1 incline shaft was deepened 51 feet during the year. The average number of natives working during the year was 3,495, as compared with 3,225 natives for the previous year. The machinery and plant have been kept in thorough repair. A total of 14 of your staff and 66 men were engaged on active service in the South-West African campaign, whilst three of the staff and two men have so far joined the colours for the German East African campaign. Your manager, eight of the staff and 31 men are on military service in Europe, in addition to which a few others have left with the intention of joining the colours, but we have not received definite information as to whether or not they have yet enlisted. I am pleased to record that since assuming the acting management of your company on the 24th May, 1915, I have received able and loyal assistance from the staff and employees.

Lydenburg Progress.

From the *Pilgrims and Sabie News* we learn that the C.B.R. Gold Reef Co., Dientje, have increased their plant, and are now running ten stamps. There are some exceedingly large channels of ore in the Dientje reef, and a thickness of ten feet is sometimes met with, so that with such large ore bodies a ten-stamp battery can easily be kept going. At Bourke's Luck Messrs. Houston and Brondum also have the Dientje reef running through their property on Bourke's Luck. They have struck a vertical reef cutting clean through the horizontal reef, and this vertical carries very heavy gold, some of the nuggets weighing an ounce; so it will be seen that this also has something to do with the success of the mine; for nobody can make a reef pay if they have to put the gold into it before sending it to the battery. The Allan Ramsay Syndicate, which bought up the Georgian and other claims on Frankfort, are erecting a larger plant. The unfortunate point about the dolomites, so far as the small man is concerned, is that the larger companies appear to have the best parts. Although most small man propositions fail in the dolomites, there are exceptions, as witness De Beer's mine on Desire, and Stanley Bush on Graskop. The sandstones and shales have been without doubt the most profitable for the small man. Take, for instance, Burnham & Munro on Graskop, Fullard on London, Dientje, Bourke's Luck, and amongst the leaders the New Chum, and Tucker on Ledophin, while, within a few months' time, another shale reef will be going through the mill, this will be the Language reef, on the property of the New Frankfort Syndicate. At Ledophine Messrs. Tucker and McLanagan started their battery some weeks ago, and so far success has attended their efforts. After running a month, during which six full days were recorded, a yield of 100 ozs. resulted.

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MISCELLANEOUS DIVIDENDS FOR 1915.

List of Declarations by Outside Gold Mines, Coal and Base Metal Companies.

In addition to the dividends of Rand companies, detailed last week, the following mining dividends have been declared:—

Outside Districts Gold Mines.

Company	Date	No. of Dividend.	Rate %	Capital £	Amount £	Total for Year Rate %	Total for Year Amount £	Total Last Year. Rate %	Total Last Year. Amount £
Ceylon Lydenburg...		—	—	22,600	—	—	—	10	2,260
Fairview (T.C.L.)...		—	—	47,000	—	—	—	8¾	4,113
Glynn's Lydenburg..	Jan.	10	—	170,000	17,000	—	—	—	—
	July.	10	—	,,	17,000	20	34,000	20	34,000
Nigel	June.	37	5	223,106	11,155	5	11,155	7½	16,733
Piggs Peak (Swaziland) ...		—	—	223,226	—	—	—	2½	5,580
Sheba	May.	—	5	269,738	13,487	5	13,487	15	40,461
Sub Nigel	Dec.	6	2½	431,580	10,789	2½	10,789	5	21,579
Transvaal G.M. Est.	Mar.	18	12½	604,225	75,528	—	—	—	—
	Sept.	19	10	,,	60,422	22½	135,951	35	211,478
							205,382		336,204

Base Metal Mines.

Company	Date	No. of Dividend.	Rate %	Capital £	Amount £	Total for Year Rate %	Total for Year Amount £	Total Last Year. Rate %	Total Last Year. Amount £
Rooiberg	June.	9	7½	180,000	13,500	—	—	—	—
	Dec.	10	5	,,	9,000	12½	22,500	12½	22,500
Swaziland Tin ...	June.	15	7½	82,000	6,150	—	—	—	—
	Dec.	16	7½	,,	6,150	15	12,300	—	—
Zaaiplaats	April.	16	35	60,000	21,000	35	21,000	45	27,000

Coal Companies.

Company	Date	No. of Dividend.	Rate %	Capital £	Amount £	Total for Year Rate %	Total for Year Amount £	Total Last Year. Rate %	Total Last Year. Amount £
Apex	June.	18	5	300,000	15,000	—	—	—	—
	Dec.	19	10	,,	30,000	15	45,000	7½	22,500
Anglo-French Nav. (Pref.) ...	June.	10	5	120,000	6,000	—	—	—	—
	Dec.	11	7½	,,	9,000	12½	15,000	12½	15,000
Breyten Collieries...	June.	5	8¾	90,000	7,875	—	—	—	—
	Dec.	6	7½	,,	6,750	16¼	14,625	7½	6,750
Cassel	Dec.	12	5	200,000	10,000	5	10,000	5	10,000
Clydesdale Coll. ...	June.	—	5	185,000	9,250	5	9,250	5	9,250
Coronation Coll. ...	June.	8	10	83 000	8,300	—	—	—	—
	Dec.	9	10	,,	8,300	20	16,600	15	12,450
Douglas	Dec.	—	5	175,000	8,750	5	8,750	5	8,750
East Rand Gold and Coal		—	—	50,000	—	--	—	5	2,500
Middelburg Steam (Pref.)		—	5	65,000	3,245	5	3,245	5	3,245
(Ord.)		—	—	99,888	—	—	—	3¾	3,542
Transvaal Coal Trust	June.	31	8¾	545,760	47,754	—	--	—	—
	Dec.	32	12½	—	68,220	21¼	115,971	16¼	88,686
Transvaal and D.B. Investment ...	Nov.	13	17½	185,000	32,375	17½	32,375	17½	32,375
Tweefontein Coll. (Pref.)	*Mar.	—	4	75,000	3,000	—	—	—	—
	†June.	—	6	,,	4,500	10	7,500	—	—
(Ord.)	*Mar.	—	19	60,000	11,400	—	—	—	—
	†June.	—	6	,,	3,600	25	15,000	25	11,462
Witbank	Feb.	20	7½	210,000	15,750	—	—	—	—
	Aug.	21	12½	,,	26,250	20	42,000	25	52,500
Welgedacht	Dec.	2	2½	156,750	3,919	2½	3,919	5	7,838

* Final in respect of 1914. † Interim.

MINING EXAMINATIONS.

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*HANDLING ROCK DRILLS UNDERGROUND ON THE RAND.

Some Helpful Practical Hints Conveyed in Simple Language.

Hoses.—It will pay the miner to take care of his air hoses, by himself seeing that his natives have put everything in a safe place before he marks their tickets. Every dent and leak in his air hose, which is already too small if it is of the usual inch size, for a 3¼ in. drill means loss of drilling power to the machine. For the same reason the miner loses by making leaky connections when tight ones are easily made by using gaskets of fuse.

Rigging up.—There is much for the young miner to learn here for a start. With an ordinary rock-drill the one thing necessary is to have it mounted absolutely firmly and rigidly, so that it can deliver its blows on the rock from a solid secure position. If this is not attended to, the rebound or recoil after each blow is struck throws the rock-drill and the drill steel out of the line of the hole. This means that the drill bit does not strike the bottom of the hole a true straight blow, but rubs and glances on the side of the hole, and the bit quickly loses its gauge and becomes blunted and the hole is rifled, i.e., bored with grooves in its instead of being truly round, owing to the machine not turning properly. All sorts of forces are set up which tend to cause the steel and machine to bend or break, and if not attended to quickly, bar and machine may become loosened and fall down. With hammer drills like the Leyner, etc., the rebound is not so severe; but a firm rig up is equally necessary for the best work. In setting the bar three things must be considered: First, a good spot for a firm rig; second, a spot at the right distance from the face; third, a spot where as many holes as needed can be drilled to the greatest advantage. For the first, one looks for a spot where the height is about right for the bar length with as little blocking and wedging as possible, and where the foot and hanging wall are as nearly parallel as possible. Stopers should always try to obtain several bars of different length to make rigging-up easy. Avoid, if possible, rigging on a slanting head that requires many wedges, as it will be difficult to avoid the recoil loosening the bar. The bar should be rigged at a distance from the working face, so that when the machine is set up on the arm parallel (that is, running in the same direction with) the face and the cylinder run right back in the cradle, and when a starter drill steel of ordinary length has been put in with the piston run out, the drill steel just touches the face to be bored. This distance is easily found when one knows the length of starter and the length of the machine one is using from the centre of the cradle to the bottom of the chuck. With big machines it is about the distance of half an ordinary man's reach. The reason for this is that one is then able to bore the longest possible holes with the steel one has, and that little boring will be done with the cylinder run right out of the cradle, which is not so efficient; and that, most important of all, the hole can be pitched or started with the cylinder well back in the cradle, when this work can be done in half the time. If the bar is set too close to the face it will be difficult to take out the blunt drills, and the machine may have to be removed, which means losing time. Rigging up with piston drills takes a considerable part of the working time, so it pays to try and rig up to drill as many holes as possible from one rig-up. One must learn to plan out one's work before rigging. This matter is dealt with later on when discussing development and stoping; but it is knowing how to plan that makes much of the difference between a bad and a good worker. Experience is needed, and a knowledge of how explosives act. One must have some idea of how much ground one hole will break and how much ground will be left for another behind it. One must have some idea how any slight breaks or heads showing in the rock will affect the breaking of a hole, and how holes can best be drilled to take advantage of them. One must judge where a hole can be quickly pitched (started) and where it will take too long or be impossible to start. Here hammer drills make this work much easier. One must know when a long hole will pay to drill and where it would be only waste of time and explosive to drill a long hole. One's first attempt in attacking a new working place should be to find out how the ground breaks, and how much burden the holes drilled can carry. Then one knows how and where to rig to the best advantage.

Bars.—These are known as double jack and single jack, one having two screws set in a frame about 15 inches apart at one end of the bar, and the other bar one screw only, which is a part of the bar. The first gives a securer and firmer rig, but is more difficult to handle and tighten in an awkward place. It is generally used in development work, but is very useful in the flatter large stopes of the East Rand. It should be always set with the line of the jacks and blocks in the direction of the holes to be bored, or otherwise it will be impossible to lower the arm sufficiently to drill the lowest holes. The actual rigging up of the bar can best be learned from experience. One needs, however, to be quite certain that everything is firm before starting the rock drill at full power, or accidents will happen. Even if everything is tight, after drilling a little re-tighten the bar, as the vibration will have had some effect, and when finally satisfied lock the screws of the jack by driving ⅞ in. bars through their heads and also against the side of the bar itself. When the bar is erected a small collar or safety clamp is moved to support the arm at the height desired and then fastened. Arm and clamp are then fixed in the desired position, the clamp not yet being tightened hard. The machine must then be lifted or slid into its seat on the clamp and the jig bolt partly fastened. The machine, which before being put away should have had its air connections and exhaust plugged with rag or paper, should now be oiled with about two tablespoonfuls of thick oil. Any drill not having a self-oiling device should be given a little oil after each hole is drilled. If oiling is left to the natives, too much oil is given, and given too seldom, in the shift. Half-a-pint of oil given in small lots is better than the pint many miners waste in large doses. Do not pour oil into hoses, as it destroys the inner lining, and then you suffer. Meanwhile, hoses should have been fixed and blown through to remove dirt. The machine is now fixed in position to drill, and before starting all bolts are carefully tightened, and the starter (jumper) fastened. The machine is fed forward until the drill at nearly full extension of piston touches the rock. Air is turned on gently and the stroke is shortened. Then more air is turned on to pitch the hole. It must here be remembered that a piston drill has a stroke of 5 or 6 inches; to start a hole, however, only about half-stroke should be used until the depth of the hole is more than the length of the stroke. If, as is too often done, the long stroke is used too soon with the idea of saving time, the drill bit, owing to the slight movement of the arm which it is impossible to prevent, will jump out of the hole and strike around the sides of it, blunting the drill, loosening the bar, and losing time. In very soft ground greater liberties can be taken, but it saves time to collar the hole carefully. If the rock face slopes at an angle, it is very often necessary to swing the machine round to another position and drill three or four inches from there to give a start for the hole when the machine is swung back. Very often where two machines are rigged, one machine can cross-start a hole in a bad place for another. A very large proportion of time wasted drilling is in using bad judgment in collaring holes, or in leaving this work to the natives. One never knows if the rock is not going to break away, or the hole " run away " before collaring; this will give an entirely different direction than that intended to the hole, thus causing bad work. The duty of the white rock-driller is, as far as possible, to see every hole properly started himself, only so can he be sure of doing good work and making money. The man who tells his boys to drill "there" and "there" and then goes away is neglecting his part of the work.

(To be continued.)

[* From " Practical Mining on the Rand," by E. M. Weston, A.R.S.M.B.]

DECEMBER OUTPUT: GROUP RETURNS.

Rand Mines Group.

The following are the results of crushing operations of subsidiary companies for the month of December:—

Company	No. of Stamps Running	Tube Mills	Tons crushed	Estimated Working Costs per Ton.	Total Fine Ozs	Total Estimated Profit.
Rose Deep ...	300	7	68,000	16/10·4	19,423	£23,464
Geldenhuis Dp.	300	7	59,000	19/11·1	17,757	15,097
Nourse Mines .	260	7	55,500	19/ 4·2	16,277	14,008
Ferreira Deep .	280	7	53,550	21/ 0·9	24,538	45,380
Crown Mines ..	660	26	209,000	17/ 7·8	65,441	87,584
Durban Rd. D.	100	3	27,300	23/ 0·3	8,698	4,720
Tls. & averages	1900	57	472,350	18/ 8·6	152,134	£190,253

The following are the results of crushing operations of Central Mining Companies for the month of December:—

Company	No. of Stamps Running.	Tube Mills	Tons crushed.	Estimated Working Costs per Ton	Total Fine Ozs.	Total Estimated Profit.
Modder B. ...	*96	6	45,000	16/10·9	24,144	£62,368
New Modder ..	180	7	52,500	16/ 8·3	27,673	£71,321
City Deep	†154	9	61,000	19/11·8	29,208	60,503
Village Deep ..	180	7	52,000	20/ 6·2	18,535	23,761
Village Main R	160	4	8,200	56/ 0·9	1,835	‡15,383
Robinson	250	6	58,000	13/ 2·4	17,392	33,949
Bantjes Cons...	90	3	23,080	19/ 6·0	5,646	986
Tls. & averages	1110	42	299,780	18/ 8·1	124,433	£237,505

‡ Loss.

* Includes 16 Nissen stamps.

† Includes 4 Nissen stamps.

Modder B.—Yield was abnormally high.

New Modder.—Yield was abnormally high.

Village Main Reef.—Normal operations resumed in January.

Barnato Group.

The results of operations of the Barnato group for December are as follows:—

Mine.	Stamps.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte ...	100	54,700	£69,957
Ginsberg	80	15,855	17,413
Glencairn Main Reef ...	160	20,060	14,794
Government G.M. Areas ...	100	49,700	66,779
New Primrose	140	22,500	17,307
New Unified	60	13,800	14,324
Quest	35	3,875	2,904
Van Ryn Deep	80	43,850	81,221
Witwatersrand	215	42,450	53,889
December totals ...	970	266,790	£338,588
November totals ...	970	260,402	£342,203

Mine.	Total Working Costs	Working Costs per Ton Milled.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ...	£42,822	15·657	£27,633
Ginsberg	13,873	17·500	3,672
Glencairn Main Reef ...	12,910	12·871	2,057
Government G.M. Areas...	50,951	20·503	16,252
New Primrose	13,674	12·154	3,742
New Unified	9,860	14·289	4,606
Quest	2,677	13·814	292
Van Ryn Deep	37,423	17·069	45,067
Witwatersrand	30,797	14·510	25,007
December totals ...	£214,987	16·116	£128,328
November totals	£216,029	16·037	£130,590

Monthly Gross Profits.—January, £126,738; February, £118,382; March, £128,225; April, £128,526; May, £131,577; June, £134,592; July, £135,782; August, £136,953; September, £130,527; October, £129,397; November, £130,590; December, £128,328.

Neumann Group.

The following are particulars of the results achieved by the crushing companies of this group during last month, and officially supplied, viz.:—

	TONS.	YIELD.	PROFIT.
Witwatersrand Deep ...	41,800	£49,980	£16,038
Wolhuter	34,400	44,058	13,738
Consolidated Main Reef .	29,000	43,994	14,387
Main Reef West	24,790	27,465	3,805
Knight Central	29,500	30,892	4,161
Total for group ...		£196,389	£52,129

Albu Group.

The following information is officially supplied regarding the December operations of the producing companies of the group:—

Company.	Stamps.	Tons Crushed.	Total Cost.
Aurora West	80	14,900	£13,997
Meyer and Charlton	75	14,995	13,648
New Goch	120	30,300	20,925
Roodepoort United	80	35,167	30,987
Van Ryn Estate	140	38,270	28,577
West Rand Consolidated ...	100	31,500	29,472
	595	165,132	£137,606

Company.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	18/ 9·5	£18,147	£4,150
Meyer and Charlton	18/ 2·4	34,168	20,520
New Goch	13/ 9·7	29,051	8,126
Roodepoort United	17/ 7·5	37,153	6,166
Van Ryn Estate	14/ 11·2	46,280	17,703
West Rand Consolidated ...	18/ 8·6	39,668	10,196
		£204,467	£66,861

Goerz Group.

Results of operations of the producing mines of this group for the month of December:—

Company	Stamps.	Tons Crushed.	Total Revenue.	Revenu per ton.
Geduld Proprietary ...	60	26,000	£42,480	32/ 8
May Consolidated	100	14,000	11,545	16/ 6
Modder Deep Levels ...	60	34,800	63,719	36/ 4
Princess Estate	60	23,400	29,480	25/ 2
Totals	280	98,200	£146,684	—

Company	Costs.		Profit.*	
	Total.	Per Ton.	Total.	Per Ton
Geduld Proprietary	£28,362	21/ 10	£14,118	10/ 10
May Consolidated	10,356	14/ 10	1,189	1/ 8
Modder Deep Levels ...	28,518	16/ 5	34,661	19/ 11
Princess Estate	28,441	24/ 4	1,039	0/ 10
Totals	£95,677	—	£51,007	—

*Including Sundry Revenue.

Geduld Proprietary Mines, Ltd.—In addition to the above, the gold in reserve amounting to 4,431 ozs., or £18,758, has been transferred to the credit of profit and loss account as at 31st December, 1915.

Zaaiplaats Tin.

Concentrates produced at Zaaiplaats during December amount to 35 long tons, averaging 70 per cent. metallic tin,

Mine Safety, Sanitation, and Welfare Bulletin.

UNDERGROUND ACCIDENTS ON THE RAND.

Ten Months' Mortality Figures— Progress of Safety Competitions.

The Rand Mutual Assurance Company has inaugurated a comprehensive prize scheme in connection with the reduction of accidents on Witwatersrand Gold Mines. There are two competitions, one for the best absolute record, the other for the highest percentage improvement on the mines' own rate calculated over the previous three years. The organ of that company, *The Reef*, gives the following table showing the average accident death-rate for the three years to 1914, and for the ten months of last year. The final column gives the order of merit in the various classes in competition II. :—

	Three years. 1912-13-14.	Ten months. Jan.-Oct., 1915.		
	Underground Accident Death Rate.	Underground Accident Death Rate.	Underground Employees.	Position in Competition II.
Class A—Under 1,500 underground employees.				
New Unified	.42	—	569	+104.2
Ginsberg	8.33	3.76	956	+100.6
Meyer and Charlton	3.75	1.55	772	+80.7
Aurora West	3.13	2.23	1,078	+37.8
Glencairn...	5.53	4.19	860	+37.6
New Primrose	1.67	1.17	1,022	+34.9
New Rietfontein	3.44	2.79	430	+25.4
New Heriot	2.36	2.22	1,082	+7.3
Durban Roodepoort	1.20	1.35	890	—14.0
May Consolidated	4.19	5.95	806	—59.6
Vogelstruis Estate	4.19	7.94	1.209	—127.0
Class B—From 1,500 to 2,500 underground employees.				
*Modder Deep	7.77	—	1,586	+177.7
*Government Areas	16.02	7.33	2.457	+141.1
Bantjes	2.84	—	1,888	+128.4
Geduld Proprietary Mines	4.73	.68	1.777	+126.1
West Rand Consolidated	2.59	—	2,394	+125.9
Main Reef West	6.11	3.13	1,919	+78.6
New Goch	4.19	2.34	1,542	+62.7
Princess Estate	4.46	2.55	2.353	+61.9
Witwatersrand	7.06	5.15	2.095	+46.2
*Van Ryn Deep	5.99	4.45	2.158	+41.1
Van Ryn Estate	1.78	1.78	2,023	—
Modder B	3.22	3.57	2,354	—14.4
Knight Central	3.26	3.65	1,973	—15.9
Wolhuter	1.22	1.52	2,362	—27.6
Consolidated Main Reef	2.38	3.16	1,896	—40.6
City and Suburban	3.26	8.65	1,942	—219.2
Luipaardsvlei Estate	2.39	7.06	1,530	—242.1
Village Main Reef	3.67	11.17	2,149	—279.4
Class C—Over 2,500 underground employees.				
City Deep	9.30	4.09	4.103	+108.1
Simmer and Jack Proprietary	6.99	2.98	3.224	+97.5
E.R.P.M. Cason	†	3.24	2.595	+93.1
New Modder...	3.84	1.34	2,690	+90.1
Geldenhuis Deep Eastern	4.15	1.72	2,097	+82.9
Witwatersrand Deep...	5.87	3.48	2.760	+64.6
Roodepoort United...	7.74	5.08	2,600	+61.0
E.R.P.M. Comet	†	5.32	2,482	+43.1
Nourse Mines	4.35	3.05	4,321	+42.9
Crown Mines Eastern	3.54	2.48	8,229	+40.5
Consolidated Langlaagte	3.47	2.51	2.867	+37.3
E.R.P.M., Driefontein...	†	5.62	2,778	+35.9
Geldenhuis Deep (West)	5.40	4.14	1,739	+35.9
Village Deep...	4.71	3.91	3,067	+25.0
Robinson	4.45	4.89	2,698	+15.9
Durban Deep	4.24	3.77	2,544	+15.8
Rose Deep, Rose Section	†	2.89	1,245	—1.8
Crown Mines, Western	6.53	6.73	4,456	—5.1
E.R.P.M., Southern Section...	†	7.47	642	+8.7
Rose Deep, Glen Section	†	3.38	2,488	—23.9
Brakpan	4.08	5.95	3,429	—64.5
E.R.P.M., Angelo	†	11.89	2,322	—113.1
Ferreira Deep	3.37	7.42	3,236	—160.7

Note.—Subsequent deaths (i.e., those resulting in later months from accidents) since June are not included. When this is eventually done the position of some competitors will be altered.

* Competition No. 1 only.

† In the cases of the East Rand Proprietary Mines and the Rose Deep it is impossible to give the sectional figures for the three years to December, 1914, and the comparisons have been made with average rates for the entire mine, viz., 7.11 and 2.85 respectively.

The Metal Market.

The market report, dated November 19th, says, *inter alia*, that the Standard tin market has been erratic the highest prices being touched on Monday, the 15th ult., £176 10s. for three months and £181 for cash Straits being paid, whilst on Wednesday £169 was accepted for three months. With a rise on Thursday to £175 for three months, the market closed on Friday the 19th at £172 5s. cash, and £171 three months. The aggregate transactions during the week under review were about 1,700 tons; the market had taken a fresh lease of life, and free dealings in considerable lines were a marked feature. Buying was done chiefly by dealers against sales of metal in America; the selling emanated from quarters hedging against purchases of ores, and from speculators. Smelters in the Straits Settlements and in Java had disposed of considerable quantities at full prices. There was a steady demand from Home consumers, the tinplate market being good. In America fancy prices were paid at one time for spot delivery, and an active business for forward delivery was put through much above London parity. The continued scarcity of early metal in America testifies to the tremendous consumption going on over there. The rise had also brought forward good orders from France and Russia. Shipments from the East promised to be heavy, but it seems that the tin is wanted, especially as direct sailings between Singapore and New York are extremely scarce, and New York has to draw supplies via London.

Later news says:—The reaction in prices which commenced at the end of last week continued during this week. Prices opened on the 22nd ult. at £171 cash, and £170 three months, and by the 25th had fallen about £5. The close is better at £168 10s. cash, and £168 three months. Speculators continued to realise, and there was evidence of some bear selling. Home consumers have bought sparingly, and there are renewed fears that the use of tin in South Wales will be restricted owing to the difficulty of getting steel. Italy and Russia have placed good orders during the week for shipment direct from the east. In America prices have fallen considerably. There is an impression that just as the rise of spot tin to about £210 was exaggerated, so the fall will be overdone. The consumption in America is larger than ever owing to the extraordinary activity of the tinplate trade, and the improvement in general business. Smelters in the Straits have sold more sparingly, and holders of Banca tin having disposed of considerable quantities recently are now disinclined to follow the market downwards. Statistics promise to show some increase in the visible supply, but stocks are small especially in America. Shipments from the east are not being effected as rapidly as desired, and any delay in arrival may cause serious embarrassment.

THE NEW COAL-DUST EXPERIMENTS.

Seventh Report of the Explosions in Mines Committee.

[By J. S. Haldane, M.D., F.R.S.]

In a prefatory note to the Seventh Report, now dealt with, Sir Henry Cunynghame, C.B., of the Home Office, Chairman of the Committee, remarks that, although they have not been able to go so far as to say that the use of incombustible dust will render explosions in mines impossible, the Committee came to the conclusion that its use in the quantities and in the manner described in their reports will greatly diminish their number and limit their violence. The Committee, however, had to consider whether the scattering of considerable quantities of fine dust in a mine might not prove dangerous to the health of persons engaged in work there, especially when such dust contained silica. In the First Report they described a series of experiments upon the matter, undertaken by Professor Beattie, of Liverpool University, which in the opinion of the Committee showed that the dust of argillaceous shale was innocuous. At the end of the Sixth Report it was stated that a further inquiry into the subject was desirable and that Dr. J. S. Haldane, whose work upon this and kindred subjects is so well known, had been asked to undertake it.

In his report, now published, Dr. Haldane, who in the experimental part of his work had the co-operation of Mr. A. Mavrogordato, fully confirms the conclusion of Professor Beattie. His investigation has shown that dust of argillaceous shale such as is found interstratified in the Coal Measures in most mines of the United Kingdom and is being extensively used for stone-dusting, although it contains silica, is not in the least likely to prove a danger to health. On the other hand, he finds ground for suspecting that flue dust, which is also being used for the same purpose, may have injurious effects and he advises that its use should be discontinued. Dr. Haldane concludes with valuable suggestions as to the kinds of material which may be used without detriment to health and as to means for limiting as much as possible the inhalation of dust by the persons in the mine.

Sir H. Cunynghame states that he received, and placed before the Committee, the following letter from Professor Dixon, F.R.S., one of its members, expressing, with one reservation, his agreement with the recommendation contained in the Sixth Report:—

"The University, Manchester,
"July 21st, 1915.

"Sir,—As I did not have an opportunity before leaving England last year of discussing the final draft of the Sixth Report of the Explosions in Mines Committee, I wish to say that there is one passage in that Report to which I take exception.

"The Committee say:—'The 1.1 mixture of coal dust and incombustible dust can, we believe, be regarded as proof against ignition by the flame of the most violent firedamp explosion.'

These words appear to me to bear a meaning which goes beyond the facts experimentally established; they amount to an expression of opinion that no explosion of firedamp, however violent is capable of igniting a 1.1 mixture of coal and incombustible dust. Before so definite a conclusion could be drawn I think more evidence is required on the violence which might be set up in an explosion of firedamp, either mixed with air alone, or reinforced by untreated coal dust—as it might be along a working face.

"With this reservation I agree entirely with my colleagues in the precautions recommended in the Report.—I have the honour to be, sir, your obedient servant,

"HAROLD B. DIXON."

A full abstract of Dr. Haldane's Report is appended:—

Effects of Inhaling Dusts Applicable for Stone-Dusting in Coal Mines.

The experiments initiated under Sir William Garforth's direction by the Committee of the Mining Association of Great Britain and carried forward at Eskmeals by the Explosions in Coal Mines Committee until definite quantitative results were reached, have shown that by the addition of a certain proportion of inert dust the coal dust which is the inflammable agent in all great colliery explosions may be rendered non-inflammable, and that a practical means of entirely preventing these great disasters is thus available. It is known, however, that certain kinds of chemically inert dust produce, when breathed in large amounts, or over long periods, very serious effects on the lungs of men. Hence, it is necessary to ascertain that any variety of dust used for preventing explosions introduces no new danger owing to its being breathed in such amounts as might be the case among men employed in coal mines.

The question involved is one that requires careful consideration, since the effects produced by inhaling certain varieties of inert dust are extremely serious. Fortunately, these grave effects are practically unknown in connection with coal-mining; but in certain kinds of metalliferous mining and other occupations they gave rise to dangers which entirely dwarf those which at present arise from explosions in coal mines. Statistically this aspect of the subject has recently been dealt with somewhat fully in the Report of the Royal Commission on Metalliferous Mines, and the evidence has been reviewed which points without a shadow of doubt to the connection between the inhalation of certain kinds of dust during mining work and the occurrence, usually after many years of exposure to this dust, of phthisis and other lung disease.

I have prepared Table 1 from the data as to numbers employed and deaths in different age-periods in different occupations, as given in the last Decennial Supplement to the Registrar-General's Reports, and the Report to the Home Secretary on the Health of Cornish Miners.

Table I.—*Annual Death-rates, England and Wales*, 1900-1-2, *per* 1,000 *living at each Age.*

	Age 15-20.				Age 20-25.				Age 25-35.				Age 35-45.				Age 45.55.				Age 55-65.			
	Lung disease.	Accident.	Other causes.	Total.	Lung disease.	Accident.	Other causes.	Total.	Lung disease.	Accident.	Other causes.	Total.	Lung disease.	Accident.	Other causes.	Total.	Lung disease.	Accident.	Other causes.	Total.	Lung disease.	Accident.	Other causes.	Total.
All occupied males ...	0.8	0.4	1.0	2.2	2.0	0.5	1.9	4.4	2.8	0.6	2.6	6.0	4.4	0.7	5.1	10.2	6.3	1.0	10.4	17.7	8.7	1.3	21.0	31.0
Farm labourers	0.5	0.4	0.8	1.7	1.3	0.6	1.6	3.5	1.5	0.5	2.1	4.1	2.0	0.7	3.3	6.0	3.1	0.9	6.6	10.6	4.4	1.3	13.6	19.3
All coal-miners	0.7	1.2	1.3	3.2	1.4	1.2	1.9	4.5	1.6	1.2	2.1	4.9	2.4	1.6	3.6	7.6	4.8	2.1	7.8	14.7	12.0	2.8	21.2	36.0
Coal-miners, Notts and Derbyshire	0.6	0.9	1.0	2.5	1.3	0.9	1.5	3.8	0.9	0.9	1.5	3.3	2.2	1.0	2.8	6.0	2.8	1.1	7.3	11.2	8.9	2.3	20.0	31.2
Ironstone miners	1.0	1.6	0.5	3.1	0.7	0.7	1.6	3.0	1.9	1.5	1.9	5.3	2.4	1.4	2.8	6.6	5.6	1.4	5.2	12.2	8.7	3.0	16.3	28.0
Miners living in Cornwall	0.7	0.5	0.5	1.7	2.7	1.7	1.4	5.8	17.3	0.8	2.8	20.9	33.2	0.6	3.2	39.0	32.2	1.3	11.1	44.6	42.6	0.5	27.4	70.5

It will be seen that among the miners living in Cornwall (including large numbers of men who have worked in the Transvaal) there is a great increase in mortality after the age of 25 or more, and that this increase is due to lung disease (mainly phthisis). The increased death-rate from this cause dwarfs entirely the death-rate from all other causes put together. A similar disproportionate increase in mortality from lung disease with increasing age is seen in various other occupations in which men are exposed to dangerous dust.

The table also illustrates the well-known fact that coal-mining is at present one of the relatively healthy occupations, and that, up to the age of about 55, coal miners, though they are very much exposed to inhalation of dust, have an exceptionally low mortality from lung disease (especially from phthisis), in this respect resembling the agricultural classes. So striking is the freedom of coal miners from phthisis that it has even been supposed that coal dust protects the lungs from phthisis. As, however, ironstone miners are equally free from phthisis, there seem to be no real grounds for this supposition. The truth is that mining itself is a thoroughly healthy occupation, provided that the exceptional dangers which are apt to be associated with it are avoided.

(To be continued.)

Rhodesian Section.

LATEST RHODESIAN MINING NEWS.

Giant Mines—S.A. Prospecting and Concessions—United Rhodesia Gold Fields.

Apparently the directors of the Giant have now abandoned all hope of finding the long-lost reef. It was thought that operations on the Giant South might prove helpful, but there is again disappointment as the result of 584 feet of development, and work here has ceased. The manager finds it impossible to give any reliable figures as to ore reserves, but he thinks the present reduced scale of crushing may be continued for some time to come. In the Cam-Good Shepherd and Petrol mines the ore reserves are estimated at 124,087 tons of an average value of 44s. per ton. About 482 feet of driving, etc., was accomplished. The general manager regards the result as satisfactory. Working costs during the twelve months ended June 30 averaged 12s. 9d. per ton, an increase of 2s. 2d., due to the small tonnage milled. The company has debtors for £57,353, against £97,245, and creditors £10,816, compared with £14,483. The interest on loans and investments was £5,811, raising the working profit, etc., to £12,536. Of the £10,610 carried to balance sheet, income tax claims £9,312.

* * * *

The report of the S.A. Prospecting and Concessions Syndicate, Ltd., for the twelve months ended 31st August, 1915, states that Mr. Allan Edington has been in charge of the mine since Mr. Laroque left at the end of September, 1914, and has given every satisfaction and has been indefatigable in his search for new ore bodies. The number of stamps was increased on 1st October, 1914, from five to eight stamps, having a nominal crushing capacity of 1,500 tons of oxidised ore per mensem. The following is a summary of the reduction operations during the twelve months under review: Stamps ran 327 days; mill crushed 16,265 tons; fine gold produced by amalgamation, 2,528·34 ozs.; fine gold produced by amalgamation per ton crushed, 3·10 dwts. per ton; sands and slimes treated, 15,249 tons; sands and slimes recovered fine gold, 1,645·86 ozs.; total recovery fine gold, 4,174·20 ozs.; total recovery per ton milled, 5·13 dwts.; percentage of recovery, 80·13 per cent.; sale of bullion realised £17,257. Of the ore crushed (16,265 tons), approximately 7,763 tons came from the east reef and 8,482 tons from the west reef. The mill during the year crushed over 16,000 tons, and the consulting engineer was able to say at the end of July that he was of opinion that the current system of working would probably prove profitable on a small scale for a long time to come. The percentage of recovery has been fairly maintained, being 80·31 per cent., as against 80·99 per cent. in the previous seven months. The actual recovery of fine gold per ton milled is, however, only about half of what it was during the earlier period, owing to the fact that the ore mined was of a lower grade.

* * * *

The book cost of United Rhodesia Gold Fields shares at June 30 last was £225,439; of this £139,771 represents the quoted portion at July 30, the market value of which at that date was only £47,371, showing a fall of over 66 per cent. In addition the company has been unfortunate with the Simoona Development Company; the £4,213 which the latter owed to the former is written off, and the cost of the Simoona shares, £4,954, is also a dead loss. Investments, shares and debentures stand in the balance sheet at £237,563; "dividends and balance of interest account" shows £676. The loss on the year's operations was £17,715, more than half of which was due to the Simoona bad egg. There are sundry debtors for £8,908 and creditors for £4,148, as well as loans from bankers and others for £23,981.

FERREIRA DEEP, LIMITED.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Fourteenth Ordinary General Meeting of Shareholders for the year ended 30th September, 1915, will be held in the Board Room, The Corner House, Johannesburg, on FRIDAY, FEBRUARY 25th, 1916, at 11 a.m., for the following business:—

1. To receive and consider the Balance Sheet and Accounts for the year ended 30th September, 1915, and the Reports of the Directors and Auditors.
2. To elect Directors in the place of those retiring in accordance with the provisions of the Company's Articles of Association.
3. To determine the remuneration of the Auditors for the past audit and to appoint Auditors for the ensuing year.
4. To transact any other business which may be transacted at an Ordinary General Meeting, or which is brought under consideration by the Report of the Directors.

The Share Transfer Books of the Company will be closed from the 25th February, 1916, to the 2nd March, 1916, both daya inclusive.

Holders of Share Warrants who desire to be present or represented at the Meeting shall produce their Share Warrants (or may at their option deposit same), at the places and within the timea following:—

(a) At the Head Office of the Company in Johannesburg, at least 24 hours before the time appointed for the holding of the Meeting.

(b) At the London Office of the Company, No. 1, London Wall Buildings, London, E.C., at least thirty days before the date appointed for the holding of the Meeting.

(c) At the Office of the Crédit Mobilier Francais, 30 and 32, Rue Taitbout, Paris, at least thirty days before the date appointed for the holding of the Meeting.

and shall otherwise comply with the "Conditions as to the issue of Share Warrants" now in force.

Upon such production or deposit a Certificate, with proxy Form, will be issued, under which such Share Warrant holders may attend the Meeting either in person or by proxy.

By Order of the Board,
RAND MINES, LIMITED,
Secretaries.
S. C. STEIL,
Joint Secretary.

Head Office:
The Corner House,
Johannesburg, Tranavaal,
5th January, 1916.

ELECTROLYTIC PRECIPITATION OF GOLD, SILVER, AND COPPER FROM CYANIDE SOLUTIONS.*

[By G. H. Clevenger.]

Introduction.

The present unsettled condition of the metal market, more particularly as regards zinc and aluminium, which are used now almost exclusively as precipitants in the cyanide process, makes a consideration of electrolytic precipitation, which is apparently the most feasible substitute, of particular interest at this time. The solutions precipitated in present-day cyanide practice may contain a great variety of compounds arising from the decomposition of the cyanide, as well as from its combination with elements in the ore treated, or introduced by chemical methods of precipitation. The principal constituent of such solutions, if zinc precipitation were not used, would be simple alkaline cyanides, alkaline hydrate, gold and silver, and copper, if it occurs in a soluble form in the ore undergoing treatment. The proportion of these various constituents present, particularly of the gold and silver, is extremely small compared with the amounts of metal present in solutions made by extraction processes in other industries. Perhaps a clearer idea of the small amount of metal involved, particularly in the case of gold, will be obtained by expressing the proportion fractionally. In solutions containing 0·50 oz. of gold per ton, an unusually high proportion, the gold would form only 1/58,332 part of the solution. In a solution containing 0·05 oz. gold per ton the gold would constitute only a 1/583,320 part. In the case of waste solutions, which should be precipitated before they are discarded, it is not unusual to deal with solutions containing less than 0·01 oz. of gold per ton (20 cents), or only 1/2,916,600 of the total weight of the solution. Tail solutions containing only 1 or 2 cents per ton are common at many mills using zinc-dust precipitation. The electrolytic precipitation of gold and silver from cyanide solutions, therefore, involves the total precipitation of an extremely small weight of metal from solutions containing a comparatively small proportion of soluble salts, and which are therefore poor electrical conductors. The fact that the alkaline cyanides are readily decomposed by electrolysis and that the economy of the cyanide process depends upon the continued re-use of the solvent make it imperative to precipitate with the minimum decomposition of cyanide, and preferably with a regeneration of cyanide.

Siemens-Halske Process.

The precipitation of gold and silver from cyanide solutions by electrolysis, employing a soluble anode of the metal to be deposited, had been practised in electroplating long before the complete precipitation of gold and silver from the dilute solutions resulting from ore treatment was attempted by electrolysis, using an insoluble anode. In 1887 Dr. Siemens, acting upon observations made at his plating plant at Berling, Germany, taken together with the statements of chemical authorities that gold was soluble in solutions of the alkaline cyanides, developed a process of gold and silver extraction involving the use of dilute solutions, and electrolytic precipitation. In the course of this work zinc filings had been tried as a precipitant, but with the very dilute solutions employed electrolytic precipitation proved more satisfactory. The first experimental plant was erected at Siebenburgen for extracting gold from concentrate, and although the process was in successful operation as early as 1888 in other mining localities it was not until a number of years later, in 1893, that the Siemens-Halske process was introduced on the Rand goldfield of South Africa. With the application of decantation to the unleachable portion of the slime, which had previously been allowed to accumulate, the problem at once arose of precipitating gold from large volumes of solution that were weak in both cyanide and gold. At that time the ordinary zinc-shaving method of precipitation did not give satisfactory results when used with very weak solutions. The Siemens-Halske electrolytic process, therefore, came into general use for precipitating the solutions from slime treatment. In the Siemens-Halske process, iron anodes ½ to ¼ inch thick, and lead-foil cathodes about 0·00032 in. thick were used. In general, the anodes and cathodes were set vertically and about 1½ in. apart. There was considerable variation in the size and arrangement of the anodes and cathodes. At the Worcester plant they were 7 ft. long by 3 ft. wide, but in later installations, to facilitate handling, they were made smaller. The anodes were enclosed in sacks of textile material for the twofold purpose of preventing short circuits and of collecting the prussian blue and iron oxide formed from the iron anodes. The lead-foil cathodes were frequently cut in narrow strips for the purpose of increasing the surface. These were strung upon iron wires mounted in light wooden frames. Another expedient that gave still greater surface was to cut the lead into shavings similar to zinc shavings. These were packed into the space between the covered anodes. Various arrangements of the precipitation units were tried, but the one most favoured was to construct the containing box with alternate wide and narrow compartments serving for the down-flow of the solution, while the anodes and cathodes were suspended in the wide compartments, through which the solution had an upward flow. This general arrangement will be recognised as being similar to that of the boxes used for zinc-shaving precipitation. The current density used was from 0·03 to 0·06 ampere per square foot of anode surface. The aim was to obtain a coherent plating of the gold upon the lead cathodes. After sufficient gold had accumulated upon the cathodes (2 to 12 per cent. of their weight) they were removed, melted, and the gold recovered by cupellation, either locally or at a central reduction plant. There was a long and bitter controversy on the Rand regarding the relative merits of zinc and electrolytic precipitation. In 1898, Betty, by means of a drip of strong cyanide solution at the head of the zinc-boxes, in conjunction with the zinc-lead couple, which was first proposed by MacArthur in 1894, demonstrated that precipitation by zinc could be used satisfactorily for solutions low in both cyanide and gold. After satisfactory precipitation of these dilute solutions by zinc became possible, electrolytic precipitation rapidly lost ground and finally was entirely superseded by zinc precipitation.

Minas Prietas.

In 1899, Charles Butters, who had been identified with the introduction of the Siemens-Halske process in South Africa, assisted by two members of his former staff, H. T. Durant and E. M. Hamilton, developed a new electrolytic precipitation process, which was first successfully used for a number of years in connection with the cyanidation of a large deposit of pan-amalgamation tailing, and later of ore directly from the mine at Minas Prietas, Mexico. The original plant for electrolytic precipitation consisted of six wooden boxes, 30 ft. long by 10 ft. wide and 5 ft. deep, having a slope of one inch per foot toward one side, to facilitate the removal of precipitate.

(To be continued.)

WRIGHT'S ROPES.

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* Abstract of paper presented at the twenty-eighth general meeting of the American Electrochemical Society in San Francisco, September 16-18, 1915.

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Mining Dividends.

To the Editor, *South African Mining Journal.*

Sir,—On the basis of the present distributions, plus redemption of capital, the following are the rates of interest paid out on market rates: Kleinfonteins, 6 per cent.; Langlaagte Estates, 15 per cent.; Wolhuters, 20 per cent.; City and Suburbans, 15 per cent.; Consolidated Main Reefs, 12 per cent.; Unifieds, 8 per cent.; Modder Deeps, 11 per cent.; Gedulds, 5 per cent.; East Rands, 10 per cent.; and so on through the list. The East is the fashion, but the West and Central pay more than double those rates, and the security about the same.—Yours, etc.,

VALUATOR.

British Trade Fair, 1916.

To the Editor, *South African Mining Journal.*

Sir,—I have the honour to state that I am advised to-day by cable from H.M. Board of Trade that arrangements have been made to hold the second British Trade Fair at Victoria and Albert Museum, South Kensington, which will be open from February 21st to March 3rd inclusive, 1916. The exhibits will be confined solely to samples of British-made goods, under the following heads:—China, earthenware, glassware, toys, fancy goods, printing and stationery. The British Industries Fair reproduces the main features of what is known as the "Leipzig Fair," and its object is, of course, to bring together buyers (especially those from the Dominions or representing Dominion-merchants) and British manufacturers. An excellent opportunity is thus offered to importers in this market not only to get into direct touch with British makers able to meet South African requirements, but to place contracts, in advance, for the ultimate supply of goods under the above classifications. Since admission will be by invitation alone, possible buyers who may intend visiting England during the fortnight when the Fair will be open, and others who may be directly interested in this enterprise, should make application for an admission-card to H.M. Board of Trade, British Industries Fair, 32, Cheapside, London, E.C. Firms and others in South Africa interested in the importation of any of the above products who may be unable personally to visit the Fair might specially request their buyers in the United Kingdom to attend. It is hardly necessary, I think, for me to state that the Fair held at the Agricultural Hall, Islington, in May last, under the auspices of H.M. Board of Trade, was regarded by the Press, manufacturers, and buyers alike, as highly successful, and I have no doubt that on this occasion such result will be repeated, if not improved upon.—Yours, etc.,

H. ERNEST GAUNTLETT,
H.M. Acting Trade Commissioner.

December 24th, 1915.

Far East Rand Dormant Mines.

To the Editor, *South African Mining Journal.*

Sir,—As a good deal of misapprehension exists among Lydenburg Farm, Ltd., shareholders, as to values obtained from their Vlakfontein property, I should like to mention that borehole results of reefs struck gave 23 and 18 dwts. respectively, and in three boreholes put down on the S.E. corner of the Daggafontein Company's farm, immediately above Vlakfontein, the following results (which must have an important bearing on Vlakfontein) were obtained, viz.:—8½ inches 19 dwts., 2½ inches 31¼ dwts., and 23¼ inches 11 dwts. 9 grs.—Yours, etc.,

E. L. E.

Benoni, 5th January, 1916.

Rand Geology.

To the Editor, *South African Mining Journal.*

Sir,—Sir George Albu, in his annual report on the Van Ryn G.M. Co., as reported in your last issue, drew particular attention to "the unusually large number of reef bodies in the mine laid under contribution for supplying ore to the mill . . . and consequently the very considerable payable tonnage from this source which can be confidently anticipated," etc., etc. How curiously this statement by a mine owner compares with Dr. Mellor's geological survey version of the Far East Rand, also given in the same issue, in which he concludes that the Main Reef Leader, of the Central Rand's Main Reef series, is the sole survivor of that much over-rated series, in the said area—lying on shale forsooth—and representing the Van Ryn Reef, Brakpan, Springs, Daggafontein, and the Nigel Reef," as he puts it. My observations since the inception of these fields—boreholes or no boreholes—have led me to the conclusion that there are two noteworthy reefs in that district lying on shale, and being worked at the present moment, viz., the Van Ryn or Nigel Reef, and the Black Reef of the Black Reef series. They pertain to two different series of reefs or pebble beds, and to two different geological ages, with, maybe, millions of years dividing them. The index of the one series (Nature never leaves her works without an index!) is Langerman's Kop in the Bezuidenhout Valley, opposite Bleloch's Kop, and the other is Randfontein Estate, on the West Rand—which also boasts of a large number of payable reef bodies laid under contribution for supplying ore to the mill. The only comparison I can make between the two series of reefs is that the one is like unto chalk and the other to cheese. In spite of these local discussions *re* the nomenclature or stratigraphy of a few reefs east, west, north, or south of this vast country of ours, I take this opportunity of informing my fellow-microbes, the world over, that South Africa contains three five-mile-thick auriferous geological ages unknown to the rest of the world. The consequence is that you cannot put a drill down anywhere—except on the granites, of course where you will not strike a payable reef of some series or another, either by accident or otherwise. Of this we have had an example within the last few days in the Nigel district, where, in my opinion, the unexpected has happened, and it is more than possible that good values will result. For years it was the fashion here to dub every payable reef that was struck "Main Reef," but with the declaration of war that seems to have died out, and Van Ryn has taken its place—but I will not dilate!—Your, etc.,

SCOTT ALEXANDER,
"Rand Stratigraphist."

Johannesburg,
January 4th, 1916.

Glynn's Lydenburg.

The following are the particulars of this company's output for the month of December, 1915:—Tons crushed, 3,845, yielding 1,632·129 fine ozs.; estimated value of month's output, £6,837; estimated profit for the month, £2,670.

WANTED.—Antimony Ores; state price, percentages, analysis, quantities can deliver monthly and points of delivery. Address Manufacturer, Station C, New York, U.S.A.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Trading Companies' Dividends up to Normal for 1915—The Iron and Steel Trades in Britain—Recruiting Interfering with Normal Conditions.

The New Year opened with quite optimistic feelings, based upon the consensus of opinion that the war is shaping, on the whole in favour of the Allies. The second reason is that it was gleaned from careful enquiries made, coupled with hints thrown out by the merchants and their connections that the year 1915 had been quite a good one for the mining material trade. A representative firm admitted that they can pay the usual dividend and then add more to their reserve fund than for the previous year. The machinery dealers have not done so well, owing to absence of new works on the mines. However, the second-hand men did good business in supplying small batteries to the Northern Transvaal and Southern Rhodesia, also a lot of small motors, as well as steam engines, have been sold to farmers for irrigation purposes. As a general statement there have been no bankruptcies of any note in the mining material trade throughout 1915, and the membership of the Commercial Exchange shows an increase.

The latest bit of news is that a syndicate has just purchased a 5-stamp mill, to work a rich strike on the northern series between Witpoortje and Krugersdorp. The reef already exploited is not very thick, but it is exceptionally rich.

Iron, Steel and Hardware Goods.

An importing merchant states that, according to his advices, the conditions in the iron and steel trades in Britain continue to tighten up without intermission, and now that the stocks of iron in the Government stores have begun to show small, but steady, decreases, there has been a more buoyant feeling in the market, under the influence of which prices have had a sharp advance. The general outlook, however, is so much linked up with the war and war conditions, that it becomes almost impossible to gauge the future. In fact, all business in all directions is being severely restricted, and prices must undergo a further development owing to the enormous withdrawals of labour from production and consumption. Every week sees more and more works taken over for the supply of munitions, and this process is bound to go on indefinitely. The hematite-makers are week by week securing higher prices for their material, and considerable difficulty is experienced in obtaining supplies of raw material. The demand for half finished steel is exceedingly brisk, and following successive advances which have been declared in price, Welsh bars stand at about £8 10s. a ton. Some small business has been done at this figure, but most makers decline to quote at all until they can see how matters are going to turn out for them in connection with the proposed Government commandeering of the Welsh steel output for shell requirements. The national needs call for millions of tons of shell steel, and now negotiations are pending in Scotland for the release of phenomenally large orders. The general merchant business in iron and steel is almost negligible, and the Government are practically monopolising plants wholesale. Under existing conditions there is little room for wonder that the tendency of prices should be strongly upwards, and there seems to be no relief for Britain in sight so far as America is concerned, for it is becoming more and more difficult to buy iron and steel in the United States, or when it is bought to ship it.

Paints, Colours, White Lead, Etc.

Linseed oil has had another slight advance of 1s. owing to Oversea cable advices. It appears that the South American crops have fallen below expectations, and the Russian output is difficult to obtain. The best white lead is now 58s. per 100 lb. in Johannesburg, chiefly in consequence of the difficulty of manufacture in Britain, as a large number of the men folk joined the forces and the Government will not allow women to enter overmuch in the works; in fact, some sections are barred against them, hence it is reported that quantities of partially manufactured materials are deteriorating. The latest cable in reference to both white lead and linseed oil reports that both are rapidly rising, without comment. The supplier of this information also stated that paints and brushware are quietly, but persistently, advancing, chiefly because of the disturbance of labour conditions in consequence of Lord Derby's recruiting programme.

Timber and Building Materials.

The demand for timber is quite fair, and sawmills are well employed. There seems a disposition on the part of contractors to secure deals, floorings and ceilings, necessary to complete their present jobs at a given price, as an idea prevails that all building timber will advance even on these apparently high levels. It is obvious that if the ordinary deal goes much higher than 9½d. per foot, it will have a deterrent effect on the building trade. Galvanised roofing iron is inclined to go higher, as flat iron is already up a trifle. Bricks, cement and lime remain at the same rates, which are not expected to alter very much, as they are all locally made. The transport for bricks has eased, as the veld is better for the oxen to graze upon and, undoubtedly, that is the cheapest mode of conveyance for bricks.

Electrical and Chemical Goods.

Contractors for electrical work are complaining about the slackness of trade; but they have hopes for about the middle of next month, when a fair number of jobs are expected to be available. Owing to the continual arrivals from Overseas, stocks, with a very few exceptions, are quite good. The mining chemical trade is on the dull side, as the mines purchased so freely in 1915 that there is no hurry to come into the open market again. In the meantime, local stocks are accumulating considerably.

Revised Price List.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d., 19s. 6d. and 22s. 6d. (local do., 14s. 6d. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 2¾d. lb.; drill, 4¾d. lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in.,

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THE BARRETT MANFG. CO.: Roofing felt, floor coverings, disinfectants and Tarira.
And other Canadian and American Companies. INDENTS ONLY.

47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz·; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8½d., 11 ft. 9d., 12 ft. 9½d.; 26 gauge, 6 ft. to 10 ft., all lengths about 8d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 31s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9½d.; over, 9¾d. to 10¾d. (Oregon, 10⅛d.); flooring, 4½ x ⅞ and 6 x ⅞, 4½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4½d.; pitch pine, 5s. 7d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 25s., boiled, 25s. per 5 galls.; white lead, 56s. to 58s. per 100 lbs.; turps., 50s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yard; 3/20 coils of wire, 25s.; do., 3/22, 21s.; tubing, 12s. to 13s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 15s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Brakpan Mines.

The following information is officially supplied in regard to the December, 1915, output:—Stamps working, 140; running time, 28 days; ore crushed, 61,048 tons; tube mills working, 10; ore hoisted, 70,779 tons; ore from dump, nil; waste sorted, 13·68 per cent.; fine gold declared, 20,991·73 ozs.; value declared, £88,374, equal to 28s. 11·43d. per ton milled; working costs, £55,812, equal to 18s. 3·41d. per ton milled; working profit, £32,562, equal to 10s. 8·02d. per ton milled.

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1915.
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THE WEEK IN THE SHAREMARKET.

Prices Still Improving—Growing Interest in Far East Rand Stocks—Excellent Outlook.

The first week of the year has seen prices steadily improve, and a growing volume of business. The feature continues to be Far East Rands, and the smaller fry have been having their innings. New Kleinfonteins and Gedulds have enjoyed notable advances; and there have been large dealings in Springs and the Springs Options. Many of the dividend payers, now ex-dividend, have made up their dividends, and the whole tone of the market is healthy, with an improving tendency. It is noteworthy that the *Financial News* declares that Johannesburg now controls the market in South Africans, owing to the fact that since the beginning of the war it has taken off the market £5,000,000 worth of Rand shares, mostly Far East Rands, and paid for them in hard cash.

	Fri., 31st.	Mon., 3rd.	Tues., 4th.	Wed., 5th.	Thurs., 6th.
African Farms	7 3*	7 3*	7 8*	7 10	8 0*
Apex Mines	7 0*	5 0*	5 6	5 3*	5 3
Aurora Wests...	—	—	—	8 6*	8 6*
Bantjes Consolidated	—	7 9*	7 6*	7 0*	7 6*
Brakpan Mines	66 0	61 0*	64 0A	64 0A	65 6
Breyten Collieries	21 0*	20 0*	20 0*	20 0*	—
Brick and Potteries...	—	—	—	5 0*	5 0*
Cassel Coals...	—	—	—	—	19 6†
Cinderella Consolidated	4 6*	4 6*	—	4 6*	—
City and Suburbans...	—	34 6*	—	35 0†	34 6*
City Deeps	73 9*	69 6*	71 6A	71 0	70 6
Cloverfield Mines	6 0*	6 1*	6 6	6 8	6 9
Clydesdale Collieries	13 6*	13 6	—	13 0*	13 0*
Concrete Constructions... ...	1 9†	—	—	—	—
Consolidated Investments ...	13 6*	—	—	—	—
Consolidated Langlaagtes ...	35 0*	33 9	34 0	33 6	33 6
Consolidated Main Reefs ...	19 9*	18 3*	18 0	18 0	17 9*
Con. Mines Selections	13 6*	13 0*	14 3	—	14 0
Coronation Collieries	26 0*	—	—	—	—
Coronation Syndicates	—	—	2 0*	—	—
Crown Mines	61 3*	—	—	58 0*	58 0*
Crown Mines Debentures ...	£99*	£97*	—	—	—
East Rand Centrals...	3 0*	3 0*	3 3	3 2	3 3*
East Rand Coals...	2 1*	2 2*	2 2	2 3	2 4*
East Rand Deeps	1 1*	1 0*	1 1*	1 0*	1 2
East Rand Minings...	6 6*	7 9*	8 3*	8 6*	8 9*
East Rand Props.	—	—	20 0†	20 0†	17 9†
Eastern Golds...	1 4†	1 1†	1 0*	1 1*	1 1*
Ferreira Deeps...	—	—	—	—	40 0†
Frank Smith Diamonds	1 6*	1 6*	1 7*	1 9*	2 0
Geduld Props.	34 9	34 0	36 0	37 3	38 0
Glencairns	2 6*	1 7*	—	—	—
Glencoe Collieries	5 6*	—	—	—	—
Glynn's Lydenburgs...	10 0†	8 0*	10 0†	8 0*	8 0*
Goerz and Co....	13 0†	13 0†	—	13 0†	—
Government Areas	30 9	30 6	30 9	30 3	31 0
Jupiters	6 6*	6 6*	6 9*	7 0	7 0*
Klerksdorp Props.	—	—	—	1 6*	1 7*
Knight Centrals	10 4	10 8	11 8	11 0	11 3
Knights Deeps	—	20 0*	—	23 0†	23 0†
Lace Props.	—	5 0*	5 6	5 9*	5 11
Langlaagte Estates	—	15 6*	16 0*	16 0*	16 3*
Luipaardsvlei Estates	—	5 0*	—	5 0*	5 0*
Lydenburg Farms	5 9*	6 7	7 0	7 0	8 3
Main Reef Wests	6 3*	6 7*	6 8*	7 0†	6 6*
Meyer and Charltons	—	—	—	—	100 0†
Middelvlei Estates	—	—	1 5†	1 0*	1 0*
Modder B's	120 0*	113 6*	113 6*	114 0*	115 0
Modder Deeps	112 6*	107 6*	110 0	110 6	111 0
New Boksburgs	0 10*	1 0*	—	1 0*	1 9
New Eland Diamonds	8 0*	8 0*	10 0	9 0*	—
New Era Consolidateds ...	7 2*	6 6*	6 8*	—	7 0*
New Geduld Deeps	3 0*	3 0*	3 0*	3 0	3 4*
New Heriots	—	—	—	—	48. 9*
New Kleinfonteins	27 3	29 3	31 3	30 9	31 6
New Modderfonteins	317 6*	305 0*	312 6*	—	312 6
New Rietfonteins	—	—	—	—	0 3*
Pretoria Cements	46 6†	—	43 0*	43 6*	43 6*
Princess Estates...	3 6*	3 6*	—	—	—
Rand Collieries	—	—	—	—	2 3*
Rand Klips	5 4	5 5*	6 2	6 0	6 3
Rand Nucleus...	1 4*	1 4*	1 6	1 6*	1 8*
Randfontein Deeps	—	3 1	3 2*	3 2	3 6†
Randfontein Estates...	11 6*	12 0*	12 0*	—	12 3*
Roberts Victors	10 0*	10 0*	10 0*	10 0*	10 0*
Rooibergs...	15 0†	14 0†	11 0*	12 6*	12 6*
Roodepoort Uniteds...	6 3	6 0	5 9*	6 1*	6 6*
Ryan Nigels	—	1 6*	—	—	—
Sbebas...	1 6*	—	—	—	2 0†
Simmer Deeps	1 6*	1 7*	2 0†	1 7*	—
S.A. Lands	3 7	3 6*	3 9	3 7*	3 8
Springs Mines...	37 0	37 0	39 6	39 3	40 0
Sub-Nigels	10 0	9 10*	10 0*	10 0*	—
Transvaal Coal Trusts	47 6*	46 0	48 0	48 9*	49 3*
Transvaal Lands...	—	—	—	27 0†	—
Transvaal G.M. Estates ...	--	—	—	—	27 0†
Tudors	2 0†	—	—	—	—
Van Dyks	1 9*	—	1 9*	—	1 9*
Van Ryn Deeps	59 0	55 6*	57 6*	58 0	58 9
Village Deeps	—	—	33 6†	—	34 6†
Village Main Reefs...	—	21 0†	20 6*	—	20 0†
Vogel. Con. Deeps	0 10*	0 11*	1 0	—	1 1*
West Rand Consolidateds ...	8 6*	8 6*	8 6*	—	9 0†
Western Rand Estates	1 0*	1 0*	1 0*	—	1 0*
Witwatersrands	54 6*	—	50 0*	52 6†	51 0
Witwatersrand Deeps	25 0*	22 9	—	22 0*	22 9
Wolhuters	9 6*	9 6*	9 6*	9 9*	10 0
Zaaiplaats Tins	8 9*	9 6†	8 0*	8 6*	8 6

* Buyers. † Sellers. A Odd lots.

Among the well-known men residing in London connected with South Africa who placed themselves at the disposal of the War Office are the following: The Marquis of Winchester (Major Lord Winchester), now with his regiment "somewhere in France"; Major Frank Johnson, now of the 2/6th Cyclist Battalion Royal Sussex Regiment, who is carrying out important defence works "somewhere on the East Coast of England"; his brother, Captain Harry Johnson, late manager of the Village Deep, and now staff officer to a noted general; Captain Percy Inskip, of the Chartered Company, now carrying out heavy transport duties on the East Coast; and Lieutenant D. E. Brodie, secretary of the Chartered Company, who is now serving with the Camerons. One of the veterans is Lieutenant-Colonel Finlayson, C.M.G., late of the Kimberley Regiment, and now in command of the 3/6th Cyclist Battalion Royal Sussex Regiment.

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Engineering Notes and News.

THE DISTRIBUTION PLANT OF THE JOHANNESBURG MUNICIPAL ELECTRIC SUPPLY SYSTEM.

A Vast Municipal Area—Domestic, Industrial and Lighting Arrangements—Interesting Technical Description.*

[By J. H. Dobson, M.Sc., M.Eng., M.I.M.E., M.I.E.E., A.M.Inst.C.E.]

The Municipal area of Johannesburg is over 80 square miles in extent and is amongst the largest municipal areas in the world. A technical description of the distribution of electricity for domestic, industrial and tramway purposes with nearly 20,000 meters on the system and an annual output of over 25 million units, should prove of interest to electrical engineers generally, whilst to local engineers there will be an added personal interest because of their close association with and participation in the public services rendered by the Electric Supply Department. Owing to the discovery of gold on the Witwatersrand in 1886, Johannesburg has grown into a large and prosperous city with extraordinary rapidity owing to the wealth and stability of the gold mining which now forms the staple industry of South Africa. In 1886 Johannesburg was proclaimed a township with a population of 50, which grew in 1887 to about 3,000. In 1899 the Anglo-Boer War was declared, and in 1901 steps were taken to establish a civil government and the first elected Municipal Council came into existence in 1903. The population of Johannesburg has grown as follows:—

	Europeans.	Coloured.	Total.
1904	83,902	76,429	160,331
1911	122,071	118,510	240,581
1914	134,000	119,274	253,274

The assets owned by the Johannesburg Lighting Company were acquired by the public of Johannesburg in 1895, and those of the Johannesburg Tramway Company in 1904. After the termination of the Anglo-Boer War immediate steps were taken to place the future of the electric supply of Johanesburg on a sound and permanent footing, and for this purpose Messrs. Mordey and Dawbarn were appointed consulting engineers to the Council in July, 1902, and they relinquished their connection with the Municipal Council in 1908. The whole of the cables were manufactured and laid down by Messrs. Glover & Co., of Manchester, who were the successful tenderers in connection with the cable contract.

Choice of System of Distribution.—With all the local information at the disposal of the consulting engineers they adopted three distinct systems of electrical supply, viz. : (a) *Inner area.*—Three-wire direct current, 460 volts, arranged to give 230 volts for lighting with the neutral wire earthed. (b) *Outer area.*—Single-phase, alternating, three-wire, 400 volts, arranged to give 200 volts for lighting, neutral wire earthed. High tension single-phase mains at 3,300 volts, one leg of which is earthed. (c) *Traction.*—Direct current at 575 volts, the negative of which is earthed. Several points with regard to the working of the system may be briefly referred to. (i.) *Voltage of Lighting Supply.*—Regret is often expressed by the public that there are two distinct voltages for lighting in the "inner" and "outer" areas, viz., 230 and 200 volts for lamps, and that when consumers transfer from the "inner" area to the "outer" area, or *vice versa*, they find that their various electrical apparatus, often costly, are useless to them. (ii.) *Difficulties of Balancing the Two-Phase Generators with Single-Phase Transmission.*—Certain difficulties are experienced due to the present single-phase system of distribution working on a two-phase system of generation. For the efficient working of the two-phase generators in the station it is essential that the loads on each phase should be balanced, *i.e.*, each phase should be equally loaded, in which case the voltage on the one phase falls and it is exceedingly difficult to raise it owing to the voltage on the other phase becoming too high, as the voltage on the phases cannot be independently varied so far as generators are concerned without inefficient and expensive auxiliary apparatus. Were it considered necessary to modify the system of supply, this would only be possible by re-laying the whole cable system at an enormous cost. Generally speaking, the triple requirements as set forth must remain. (iii.) *Damage to Cables by Excavation, Cable Plans, and Granolithic Pavements.*—Special precautions have to be taken to avoid damage to cables by excavators. Inspectors are appointed to investigate every excavation made, and a clearance note is given to signify that excavations have been made and that adjacent underground cables are in order. It is of the utmost importance to have accurate cable plans, and efforts had to be made over several years to bring about the necessary accuracy and to secure the information required. Granolithic pavements in various portions of the town have played havoc with the Electric Supply Department in preventing it from dealing quickly with underground cable faults, and a bye-law had to be introduced forbidding the use of continuous granolithic pavements over any run of electric cable, only removable blocks of a suitable size being allowed. Having dealt with a few points common to the distribution system as a whole, it is proposed now to deal with each section separately, and to set forth a description of the system as the author found it when he joined the municipal service in 1909, without any reference whatever as to its origin. Thereafter will be given an account of the modifications and reorganisation to meet the public convenience. The system will be dealt with under the following heads:—Section I.—Distribution System of the "Inner" Area. Section II.—Distribution System of the "Outer" Area. Section III.—Distribution System for the power supply to the tramways. Section IV.—Public street lighting. Section V.—Concluding remarks.

SECTION I.

Distribution System of the "Inner" Area.

The "inner" or town area is that portion of Johannesburg bounded on the north by the railway, on the south by the outcrop mines, on the east by the Natal Spruit and Siemert Road, and on the west by Mayfair. The supply is direct current through a three-wire system at 230 and 460 volts, the neutral of which is earthed. The distribution system as existing up to the year 1909 was as follows : The town area was divided into ten feeding points with two additional ones that have since been installed in Kerk Street and Von Brandis Square owing to the growth of the load. These feeding points received power from the power station through feeder cables, and the power was then distributed to the consumers through distributor and sub-distributor cables, and finally through the service cables to the various consumers. The feeder cables were composed of separate single-core cables of one square inch section for positive and negative legs and ·5 square inch for the neutrals, insulated by prepared paper, then vulcanised bitumen, impregnated tape, two layers of steel armouring arranged to break joint, finally jute served and compounded. The distributor and sub-distributor cables are ·5, ·25, and ·125 square inch, triple concentric with half section for the neutrals and service connections concentric and triple-concentric according to demand. All distributor cables and service cables are paper insulated, lead covered, jute served, and two layers steel armouring breaking joint, jute served and compounded. The original method of jointing all cables was by means of cast-iron boxes filled with insulating compound. Each main feeding point consisted of a feeder box placed in the surface of the pavement, containing "three-wire" busbars on porcelain insulators, to which were attached the ends of one feeder and the ends of the distributor cables anything up to 7 in number. The attachment to the busbars was by means of studs, links and nuts, and the box was filled with an insulating compound called "diatrine." There were similar but smaller surface boxes at the sub-feeding points for the ends of the distributor and sub-distributor cables coupled up and compounded in the same manner.

(To be continued.)

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* Paper read before the S.A.I.E.E.

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BALL BEARINGS.

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The Week's Meetings.

WELGEDACHT EXPLORATION.

Disclosure of Three Coal Seams on the Company's Property.

The 14th ordinary general meeting of the Welgedacht Exploration Co., Ltd., was held in London on December 7th, Mr. P. G Hamilton Carvill (the chairman) presiding.

The London secretary (Mr. F. H. Williamson) read the notice convening the meeting and the report of the auditors.

The Chairman said : I presume that, in accordance with the usual custom, the directors' report and accounts may be taken as read. I will, however, make a few remarks about the balance-sheet. The capital of the company remains at the figure of £156,750, and the general reserve stands at £50,000, the same as in the last accounts. Rents in suspense account represents the amount of rent of our farm to September 30th, 1915, which is receivable in advance. The item sundry creditors consists of ordinary trading accounts remaining open at June 30th last, which have since been paid. On the other side of the balance-sheet the item of property and equipment account stands at £169,483 1s. 9d., and in this connection it may be remembered that we have on a previous occasion written off no less than £170,050 from share premium account. The sum of £169,483 1s. 9d. represents the cost at date of the freehold of the farm Welgedacht, together with 1,240 gold-mining claims and other rights thereon; also the expenditure on the coal and gold sections. With regard to sundry debtors, £3,199 7s. 1d., this amount has since been collected. There is no change in shares account, which represents our holdings in the Witwatersrand Native Labour Association, Ltd., and the Transvaal Coal Owners' Association (1910), Ltd., of which we are necessarily members. Payments in advance consists of licences, taxes, and insurance premiums paid in advance and advances on account of wages to natives, etc. The cash account stands at £42,166 4s. 4d., mainly on loan, on which a satisfactory rate of interest is being received. The expenditure and revenue account shows a working profit of £3,559 14s. 7d., as against £6,729 17s. 6d. for the previous year. The decrease is accounted for by the lower prices received for our coal and by the increased cost of native labour.

APPROPRIATION OF PROFIT.

The total profit earned, as shown by the profit and loss account, is £3,812 4s. 1d., which I think you will agree is satisfactory under all the circumstances. Adding the balance brought forward from the last accounts and deducting the dividend of 5 per cent. paid in December, 1914, there remains a sum of £8,016 0s. 9d. at the credit of appropriation account. It is proposed to recommend the payment of a dividend of 6d. per share, less income-tax, which will absorb £3,526 17s. 6d., leaving the balance of £4,489 3s. 3d. to be carried forward. No work has been done on the gold section during the year. It will have been noticed, however, that considerable interest has been revived in the companies working the gold reef in our vicinity, and in this connection it will be of interest to you to recall the values obtained in our claims at 1,908 feet in No. 6 borehole; the reef struck assayed 1 oz. 6 gr. over 10 inches. In the coal section the most important feature has been the disclosure of three coal seams in the south and south-east directions by boreholes. The area, as proved, extends to over 125 acres, and it is estimated that the lowest of these coal seams, which is alone taken into account, will yield 1,000,000 tons of marketable coal of a little higher calorific value than the present mine standard. This will assure about another eight years to the life of the coal mine at the present output, without taking into account further development of the deposit. I now beg to move : "That the report and accounts, as submitted, be received and adopted."

Mr. T. F. Dalglish seconded the motion, which was carried unanimously.

The Chairman proposed : "That a dividend of 6d. per share, less income-tax, be paid to the shareholders registered in the books of the company on December 7, 1915."

Mr. L. R. Davis seconded the motion, which was unanimously agreed to.

The retiring directors (Mr. A. H. D. Cochrane and Mr. T. F. Dalglish) were re-elected, the auditors (Messrs. Douglas, Low and Co., of Johannesburg) were re-appointed, and a vote of thanks to the chairman, directors and staff concluded the proceedings.

SHEBA GOLD MINING.

The Character of the Ore and Its Treatment.

The 11th ordinary general meeting of the Sheba Gold Mining Company, Ltd., was held in London on December 8th, Mr. C. F. Rowsell (the chairman) presiding.

The secretary (Mr. J. E. Booth) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said that the net result of the year's operations, after deducting the charges at the mine, etc., was a profit of £38,160, as compared with £49,549 last year. Two dividends had been paid on account of the year 1914-15, each of 5 per cent. Mine development now stood at the figure of £3,000, and as this was represented by ore reserves amounting to over 100,000 tons, he did not think it was at all unsatisfactory. The financial position of the company, he thought, might be considered a satisfactory one. Dealing with the position at the mine, he regretted that it had not improved since last year. He then indicated that the Zwartzkopje was again in a poor zone, and the work which had been carried out up to the present time had not changed the position in this respect. It was due to the serious decrease in the value of the ore from the Zwartzkopje mine (now about 2.35 dwt. per ton) that the profits of the company had been so greatly affected. This was not the first time in the history of the Zwartzkopje that they had had to pass through a poor zone, and it remained for the future to tell whether, as development was pressed forward, they would again reach a zone of higher values, from which more payable results might be secured. During the year 36,111 tons were developed in the Zwartzkopje mine, and the manager pointed out that considerably more reserves would be exposed when stoping was carried out on the various fractures already known. Coming to the Intombi mine, work on that property had increased the ore reserves by 3,400 tons, 28,138 tons having been developed during the year. The ore reserves in this mine were placed at a value of 9 dwt. per ton. Acting on the recommendation of the consulting engineer, they had secured a block of claims adjoining their own property into which the Intombi reef dipped, and as before long their workings would reach the level where they would enter these claims, he thought they were to be congratulated upon having secured them on what, according to the consulting engineer's advices, were satisfactory terms. Every possible care was being given to the question of the development of the Intombi mine, and he was satisfied that no step was being left untaken to follow all favourable indications. With regard to the Southern Cross, he regretted that it had not turned out as well as was anticipated last year, the shoot proving to be much shorter in the lower than in the upper levels, and the grade of the ore in the lower levels much below the values exposed up to the end of the previous year. At the same time, Mr. Milligan estimated, on the basis of an average stoping width of 48 inches, the tonnage to be 20,000, of an estimated value of 9 dwt. per ton.

ORE RESERVES.

He (the chairman) did not propose to refer in detail to the other properties, which were fully dealt with in the general manager's report, but the summary of ore reserves given in that report was interesting—namely, 10,700 tons in the Zwartzkopje mine, 53,400 tons in the Intombi mine, 20,000 tons in the Southern Cross mine, 14,500 tons in the Insimbi mine, and 1,500 tons in the Margaret mine, making a total of 100,100 tons. Of course, the average value of the ore had been reduced. The Sheba ore had always been a refractory one, and the ore in the Intombi mine was extremely refractory. It was therefore necessary to alter their reduction plant in order to obtain a fair recovery. This question had been before the directors for a considerable time, and many experiments had been conducted with a view to improving the result. It was only as the result of careful experiments conducted on a fairly large scale that they could definitely determine the best method of treatment. The work which had been carried on for some time was now nearly completed, and with the results of that work before them the board would have to decide, in consultation with their technical advisers, the best method to adopt out of the processes which had been tried experimentally. He hoped that before meeting the shareholders again next year they would be able to report that they had succeeded in solving this somewhat difficult problem, and that their profits, as a result, were again on an increasing scale. The monthly crushings since the publication of the report had been, as usual, published in the Press, and he regretted that they had not made a more satisfactory showing. The reasons, however, would be clear from the remarks which he had made. The directors had not received any explanation of the exceptionally low profit for November, but no doubt it was due to the general manager having to put through the mill, temporarily, exceptionally low-grade ore. The past history of the Sheba mine made one always hopeful as to the future because it had usually been at the darkest moment that discoveries had been made which had changed the whole future of the property once more.

Mr. H. D. Lewis seconded the motion, which was carried unanimously.

Engineering Works and Foundries.

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CONTENTS.

PAGE
Notes and News 451
Topics of the Week:
The Significance of the 1915 Gold Output 453
State Socialism and the Far East Rand 454
The New Patent Bill 454
Progress of the "Safety First" Movement 455
Rand Metallurgy in 1915 456
Progress of the Madagascar Oil Fields 457
Premier Diamond Mining Co.: Annual Report 457
Organising British Engineering Industry 458
Labour and Industry: Official Monthly Review 459
Gold Output for 1915 460
Correspondence and Discussion: "Dr. Mellor's East Rand Geology"; "Karroo Coal Prospects"; "Potentialities of the Far East Rand"; "Defunct Companies"; "Government Mineral Leases" ... 462
The New Coal Dust Experiment—II. 465
Electrolytic Precipitation of Gold, Silver, and Copper from Cyanide Solution—II. 467
Rhodesian Section:
Latest Mining News 469
The Week in the Mining Material and Engineering Trades 471
The Week in the Sharemarket 473
Engineering Notes and News:
Monel Metal 475

Notes and News.

The Premier Report and a Diamond Merger.

Elsewhere in this issue we print some important extracts from the report of the Premier D.M. Co., Ltd., for the year ended October 31st last. The report is naturally of a "mark time" order, and its main feature appears to be the reference under the head of "future policy" to the market outlook for the product. Reading between the lines, we detect here the foreshadowing of an amalgamation of the diamond producers of South Africa, or, at least, the recognition by the Premier people that such a consummation is to be desired. The fact is, that it has now come to be seen that there is only a certain fixed sum available each year for the purchase of diamonds. That sum will be expended, irrespective of whether less or more stones are purchasable for it. It behoves the producers, therefore, to come to an understanding in regard to the equitable absorption of the amount available, and that understanding must take into account all the factors peculiar to each producer, such as working cost, price and quality of product, and scale of operation. A mine like the Premier is obviously in quite a different case from that of De Beers; and in any selling agreement, it is clear that the former should stand out for the "closer relations" between producers, mentioned in the report. Those closer relations, to our mind, can best and only be achieved by a complete fusion of interests, the framing of which should be well within the capacity of those concerned. The Union Government, of course, would have to be consulted in the matter, for reasons apart from and additional to its big interest in the Premier Company. No great difficulty, however, should be experienced in securing the agreement of the Government in view of the manifold and considerable benefits that must accrue to the diamond industry as a whole, and to the country, from complete fusion of interests.

* * * *

Mines for Sale.

There are an unusual number of mines on the Auctioneers' lists at the present moment. Notable among them is the Rietfontein property of the Transvaal Consolidated Lands, in the Lydenburg district, where liquidation has been considered advisable in the interest of the property itself. A similar case is that of the Kaal Valley Diamond Mine, which is also advertised for sale. The Golden Hill, beyond Krugersdorp, and the Fair Maid of Perth, on the farm Frischgeraagd, which are to be disposed of to the highest bidder, have neither of them a particularly distinguished record, although the latter has an interesting history as one of the old mines of the Pietersburg district. The Golden Hill referred to is not to be confused with the Golden Hill Proprietary Mine not far to the South-West of the Pretoria Cantonments, which is said to have a distinctly bad record, and has also come to the end of its tether, for the present at any rate.

* * * *

The Wolfram Question.

Apparently the Imperial Authorities are now taking steps to augment the production of wolfram in Burma. The Lieutenant-Governor has already cancelled a neglected concession. According to a Reuter message he is interesting large Rangoon firms in the question, and has appealed to the Chamber of Mines at Tavoy to increase the output, fore-shadowing the cancellation of concessions if the Imperial needs are not met. He has also undertaken that the whole cost should be borne by the provincial revenue, as a further contribution of Burma to the war. In the above it is clear that, though belated, the Imperial Government is recognising the need of a larger supply of the metal, says the *Financial News.* The present consumption of wolfram ore in England amounts to about 3,000 tons per annum. This ore contains from 60 to 70 per cent. WO_3. When war broke out the price of wolfram was 30s. per unit, or, say, £95 a ton. To-day 55s. per unit is being paid, or, say, £190 per ton. Clearly, therefore, the Government is paying £90 to £95 a ton more than it need have done had sufficient foresight been shown at the proper time. On 3,000 tons of ore this means a difference of £270,000, which the taxpayers have to find. Wolfram, it may be remarked, is utilised in high-speed drill steel, for the purpose of turning shells. Had the matter been tackled in a proper and business-like way when war broke out the Government could have made contracts to cover practically the whole amount at 30s. per unit, and would not have been faced with a shortage. The position, we believe, was pointed out to the officials at the time; but what is the use of trying to impress the official mind about such trivialities as the national interest? The average cost of production is £60 per ton, or delivered in this country the price is between £70 and £80 per ton. It will be seen, therefore, that on the basis of 30s. per unit producers would have been in clover, whereas now the speculative element has entered into the business. In peace time wolfram ores were brought mostly by the Germans, and when hostilities began sales naturally ceased. But the Home Government did not take advantage of the position, with the result that the present high prices are being paid.

* * * *

Bravery Rewarded.

An interesting function took place at the Geldenhuis Deep on Thursday, when H.E. Lord Buxton presented the King Edward medal to J. Wagenaar, a trammer, for conspicuous bravery at the City Deep mine on October 29, 1913. Wagenaar rescued four natives from a winze. The natives had been gassed, and on four occasions Wagenaar went down a steep declivity of 250 feet and brought up the men one by one. Apart from the element of courage in dangerous conditions, Wagenaar displayed great physical strength, and at the end of his self-imposed task was in a state of collapse. Lord Buxton regretted that there had been so much delay in procuring the medal. That, however, in no manner detracted from the recognition of the bravery of Wagenaar's action, which the Governor-General warmly eulogised. In reply, Mr. Wagenaar expressed the sense of pride which he felt in receiving so great an honour; the more so as it was the first medal of the kind that the Governor-General had presented on the Rand. It had been said that he (Wagenaar) had done a great deal. Really, all he had done was his duty, and duty was expected of every Britisher. The Board of Directors of the City Deep have already recognised Wagenaar's bravery. The presentation of the King Edward medal was made in the presence of Mr. W. H. Dawe (President of the Chamber of Mines), Mr. E. A. Wallers (Chairman of the Geldenhuis Deep), Mr. E. Pam (Manager of the Geldenhuis Deep), and Mr. Malcolm Ferguson (Acting Government Mining Engineer). After the ceremony Lord Buxton, Mr. Buxton, Miss Buxton, and Lord Carlton made a short tour underground.

* * * *

Swaziland.

The annual report of Mr. D. Honey, Acting Resident Commissioner of Swaziland, dated July 17th last, is published as a white book. The total ordinary revenue shows a decrease of £6,001, and the sale of Crown lands a decrease of £3,252, but recoveries of survey costs are increased by £3,538. The Acting R.C. attributes the shortfall either directly or indirectly to the war, and in the case of Crown lands to unavoidable delay in the completion of authorised sales. Normal expenditure shows a satisfactory decrease of some £2,000, due to various economies, and the Public Debt was reduced during the year from £100,000 to £92,500. At the end of the financial year liabilities exceeded assets by £95,189. Post Office savings depositors number 166 with a total credit of £2,131. A decrease in Customs receipts by a little over £1,000 is attributed to the decrease of Union receipts on account of the war. Employment is normal, the natives being mainly mine workers, a class not affected by war conditions. Decreased trading is due to a large proportion of the white population having gone into military service. Crops were fair, and would have been better but for the destruction caused by severe hailstorms. The Acting R.C. reports that there are indications that the natives are adopting more progressive methods, and are even appreciating the value of such institutions as agricultural shows and Government experts. The chief difficulty, however, is the absence of railway transport. Twenty grants of small holdings, totalling 6,660 morgen, were made to European farmers at an average price of 6s. 3d. per morgen. Four of these grants were less than 50 morgen. The stock of the country is estimated at 500 horses, 90,000 horned cattle, 350 mules, 1,550 donkeys, 200,000 native sheep and goats, and 9,000 pigs, to which may be added a migratory 200,000 sheep imported annually from the Transvaal for grazing. In this connection the Acting R.C. thinks that it is not unreasonable to predict in time, with the feeding down of the coarser grasses and paddocking, sheep farming on the hills will become a local industry. The ravages of East Coast fever were comparatively mild, and it is noted that the descendants of Government imported sires are thriving in considerable numbers. Tin mining resulted in the extraction of metal valued at £43,256, and the gold return is £39,552, a small decrease due to the closing down of one or two small properties.

* * * *

Mashonaland Agency.

When it became obvious that the proposals put forward in September last for the reduction of the Mashonaland Agency capital were unacceptable, the question of dealing with the depreciation of assets and the reorganisation of the company's financial position still remained to be faced. It is therefore satisfactory to note that the directors have formulated a scheme which is not open to the same objections as on the former occasion. It is proposed to reduce the capital from £400,000 to £150,000 by writing off £126,342 and reducing the nominal value of the shares to 7s. 6d. A cash distribution of 6d. per share is to be made and the Wankie Colliery shares held are to be distributed. The distribution of Wankie shares will be effected by giving one fully-paid share of 10s. for every three £1 shares of the Agency, exclusive of fractions, which fractions will be sold and the net purchase money distributed. The present market price of Wankie shares is 17s. per share, so that the shareholders will receive in the distribution a return of capital equal to £123,017 12s., or 6s. 2d. per share.

* * * *

Mozambique Macequece.

The report of the Mozambique Macequece, Ltd., for the year ended 31st December, 1914, states that the action against Mr. C. Aubert, referred to in the last report, was decided in the company's favour, but this decision was reversed in the local Appeal Court and the case has been appealed to the Supreme Court at Lisbon. The cessation of tributing operations led, unfortunately, to a claim by the Mines Department for non-compliance with the regulations requiring a minimum amount of work to be done, and a payment of £317 had to be made in satisfaction of same for the year 1913-14. A further claim for a still larger amount has also had to be met in respect of the current year 1914-15. It was of importance, therefore, to obtain a further tributing contract so as to relieve the company of this heavy expense, but the war has made it difficult to negotiate business of that kind. The annual meeting has been delayed in the hope that the directors might be able to submit a provisional contract, not only for tributing, but for an option on a part or whole of the property, but the matter is still pending.

* * * *

Cape Copper.

The directors report on the Cape Copper Company for the year to April 30th shows that the net profit amounts to £33,212 and £9,154 is brought in. This has been dealt with as follows: £8,573 has been set aside for English income tax, £2,268 for Colonial income tax, and £5,850 has been paid in dividends. Out of the balance dividends of 3 per cent. (making 6 per cent. for the year) on the preference shares, and 1s. per share on the ordinary shares, both less tax, has been declared payable on January 1st. The present accounts show an improvement as compared with those of the previous year, chiefly in consequence of a larger return of copper from the mines in Cape Colony, and increased railway receipts. The general costs of production have, however, increased, while the decline in the price of copper during the earlier part of the year adversely affected the realisation of the copper in stock at the close of the previous year. The directors had hoped to be in a position to mention that the mines at Rakha Hills had reached the stage of production. The mining and concentration plant and machinery are practically completed, and the mines are in a condition to supply 300 tons of ore per day. In view, however, of the excessive rates of freight ruling, it has been found advisable to defer production until the blast furnace, which is on order, is erected, when the weight of material to be shipped will be largely decreased. The returns from the O'Okiep Mine was 13,345 tons of 10·88 per cent. assay copper ore compared with 9,781 tons of ore of 13·88 per cent., obtained in the previous year. The reserves of ore are estimated at 6,000 tons, reckoned on a basis of 20 per cent. net assay, together with 120,000 tons of low grade ores at surface of an estimated assay value of 4 per cent. These estimates show no change as compared with those of the previous year. The output of ore from the Nababeep South Mine was 68,141 tons of 4·35 per cent. wet assay. The return of the previous year was 48,049 tons of 4·37 per cent. wet assay. The reserves of ore, excluding the capping, are estimated at 160,000 tons of 5 per cent. wet assay, being a similar tonnage and assay as at the close of the preceding year. Ore extracted from the Nababeep North Mine, principally from the capping, amounted to 1,657 tons of 6·55 per cent. wet assay. The Narrap Mine output of ore was 2,692 tons of 4·79 per cent. wet assay. Work has been suspended except at the No. 18 winze from the intermediate level below the 55-fathom level, where a vein of yellow ore is being followed. Rakha Hills Mines.—The total reserve amount to 344,991 tons of 4·01 per cent. copper, 294,030 tons of this being developed ore. The reserves for the previous year were estimated at 307,747 tons of 4·13 per cent., of which quantity 99,856 tons were developed ore. The tonnage treated at the Nababeep smelting works during the year amounted to 85,109 tons, an increase of 22,523 tons over the quantity in the previous year.

* * * *

West Rand Consolidated.

A correspondent of the *Financial News* writes complaining of the decision of the directors of the West Rand Consolidated to postpone the ordering of the new plant until more normal conditions prevail. He claims that, both in the interests of the country and of the shareholders, every possible ounce of gold should be produced at this time, and he asks whether it is considered the postponement is justified. Our contemporary very properly replies: "We agree with our correspondent that every possible ounce of gold should be produced now; but there certainly is something in the remarks of the West Rand Consolidated board concerning the heavy increase in the cost of materials under present war conditions and the difficulty of obtaining supplies. As far as our information goes, cost of materials has risen by at least 30 per cent., and it is just a matter of opinion as to whether the directors would be justified in spending this extra money when no adequate return on it is possible. But, of course, there is another point, and that is the question of delivery. Orders for machinery would have to be placed in this country, and it is questionable if any firm is at present a free agent and in a position to undertake the construction of the necessary plant. The majority of such firms are busy on Government work. Then, again, the West Rand Consolidated is not a high-grade mine. These are points that our correspondent has apparently overlooked. As an alternative to increasing the plant, it is suggested that arrangements should be made for the transfer of a portion of the Cinderella Consolidated machinery to the West Rand Consolidated, which suggestion, according to our correspondent, would have a dual effect—it would enable the West Rand Consolidated to increase the production of gold, and, by bringing cash into the coffers of the Cinderella Consolidated, would enable the development of that mine to be actively resumed. At first blush the plan seems feasible; we have grave doubts as to whether it could be put into actual practice.

TOPICS OF THE WEEK.

THE SIGNIFICANCE OF THE GOLD OUTPUT FOR 1915.

THE fact that the gold output for the Transvaal in the year 1915 amounted to £38,627,461, which is higher than that for either of the preceding years and only just less than that for 1912—the record year—is satisfactory and significant. As a South African contribution to the cause of the Allies it has a special and notable significance, at this juncture, when publicists never tire of telling us, "the war will be won by money," and a "free gold market is the basis of the Empire's credit." So much has been written on the subject since the beginning of the war that it is unnecessary to repeat all that a free gold market means to London and to what extent the Rand has helped it to maintain that proud position. According to the cables, Messrs. Samuel Montague and Co., in their valuable annual review of the gold market, estimate the world's output for 1915 at £98,000,000—a record in our time—which beats the 1914 total by over £5,000,000. Doubtless the acceleration of production during the year 1915 was not confined to the Rand, and it is to be hoped that the other British countries, viz., Canada, Australia, West Africa and Rhodesia, have participated in the increased returns. The United States have doubtless maintained their position as second only to the Transvaal, but Russia, which was fourth in 1914, coming after Australasia, and Mexico, which was fifth, have probably suffered from the disturbed conditions. At any rate the gold reserve of the Bank of England has gained materially from the normal—better than normal—output of the Transvaal during the year, and the fact constitutes the finest advertisement that the industry could have in the eyes of the financial world. The United States produced 20·4 per cent. of the total in 1914, and neither from that country nor from Mexico (3·9 per cent.), nor from any of the "other countries" can Germany expect to receive any supplies. Germany contains no gold mines, and the one or two small producers in the territory of her ally, the Austro-Hungarian Empire, are insignificant. So much for the value to the Empire of the gold output of the Transvaal. What it means to South Africa must neither be forgotten: The salaries and wages earned during 1914 in the gold mines of the Transvaal amounted to £12,499.354, and the stores purchased for consumption by the gold mines during the year ending December 31st, 1914, showed a value of £10,219,301. Mr. Leisk, the Secretary of the Treasury, recently stated as his deliberate opinion that it would not be by any means an exaggeration to regard 60 per cent. of the revenues of the South African Union as being directly or indirectly attributable to the mining industries, leaving only 40 per cent. as the yield from all other sources. Speaking broadly, the mining industries provide four-fifths of the total exports of South Africa and three-fifths of its revenue. The stoppage of the diamond industry has thrown into strong relief the success which has attended the efforts of the gold industry to carry on as usual. Thanks mainly to the British Navy, the dark forebodings expressed in high quarters at the beginning of the war have not materialised. In opening the Transvaal Provincial Council in August, 1914, it may be remembered that the Administrator said: "It was clear people had no idea of the gravity of the situation. No man could say how long the present state of things would last. There was no doubt the diamond mines would have to shut down, and that would affect the Union at once. The gold mines would go on working a certain time, perhaps the whole time, but there would be no profits and no profit tax. In a state of war there would be no importations, and the railway revenue would be affected." In painting this dismal picture, the Administrator reckoned without the British Navy, to which we ought indeed be grateful for the fact that after seventeen months of war with a local rebellion thrown in, the gold mining industry of the Transvaal is still going strong. While the great industrial heart of the country thus continues to beat normally and steadily, we need have no fear of the future.

STATE SOCIALISM AND THE FAR EAST RAND.

A MOTLEY gathering of Socialists, Nationalists, and "British Citizens," sat cheek and jowl on the platform of the "monster" meeting on Wednesday night to tell the Government what it should do in regard to the Far East Rand. All were agreed that the great Far East asset must be saved from the hated capitalists. The "British Citizens" hate the capitalist because he is conceived to be a German, the Nationalists, because he is conceived to be a British Imperialist, and the Socialists because he is a Capitalist. Wherefore all were agreed that the East Rand must be saved from "Capital" by means of the State being prevailed upon to work the area itself. Several of the speakers confessed they knew little about the subject, but having admitted that great truth, they took care not to let it embarrass their eloquence. Others expatiated upon the enormous profits the State would divert to itself out of the pockets of the rapacious financiers, utterly oblivious of the risks of mining special and peculiar to the "patchy" areas of the Far East Rand, and airily agreed that the taxpayers' money could not be better employed than in exploiting the district and engaging upon the always speculative business of mining. Not a word was said about the difficulties of mining in the district, which would be accentuated rather than otherwise by the assumption of the role of mine owner by the State. As a fact, the much-condemned capitalists, whose flesh was to be made to creep by the picture of the State as mine-owner, have already suggested the trial of the idea—though only as an experiment and in the full knowledge that it was bound to prove unpractical. Just a year ago, Mr. Schumacher, in a public utterance on the same subject, said: "The Government, according to the Gold Law, will be entitled to approximately four-fifths of the mineralised area of the Far Eastern Rand. I have suggested before that the Government itself should work a portion of this area. I repeat this suggestion now. The comparison of the work done under direct Government supervision and that done by public enterprise would be most interesting and most valuable. But it may be that the Government is, for various reasons, not prepared to work any of the ground itself. We have, therefore, to look for alternative schemes of a practical nature. The first thing to be done would be to give the Government a much freer hand than it has to-day for disposing of these areas. This would mean that the Gold Law would have to be altered, and it seems clear that this should be done at the earliest possible date. It it can be done this session, all the better. If it is not done this session, it will mean that valuable time will be lost. I may perhaps remind you that the present 10 per cent. profit tax on the gold mining industry brings the Government a revenue of about £1,000,000 per annum. Dividends received by shareholders amount to about eight millions. The Government, therefore, by means of the profit tax alone and without counting its immense indirect benefits and sources of revenue, is receiving one-eighth as much as the shareholders who run all the risk and put up all the money. This is by no means an insignificant proportion. It is probably more than is taken by the Government in most metalliferous countries, and would indicate that so long as the Government receives this profits tax it need not claim very much or anything more. If this is granted, it follows that it will pay the Government to get the Far Eastern Rand worked, without demanding very much or anything at all in addition to the ordinary profits tax. It is infinitely more important to the Government and to the whole country to get this ground worked than that the uttermost farthing should be extracted from the people who are prepared to work it or a portion of it." Of course, the locking up of hundreds of thousands of pounds in each lease for a number of years and the patchy nature of the ground in question, plus the uncertainties inevitably attending mining are brought forward as formidable obstacles to any scheme of exploitation in which the terms offered are not most liberal. The question of terms must be decided upon a reasonable "give and take" basis in the light of the experience of the district won, and always with an eye to the fact that the working of the mines produces many indirect benefits to the country. The sweeping Socialistic nostrums proposed the other evening, even though supported both by well-meaning patriots and by less loyal politicians fishing in troubled waters, certainly are not called for.

THE NEW PATENT BILL.

AMONG the Bills to be presented for second reading when the Union Parliament re-assembles is the draft co-ordinating and codifying the laws relating to the grant of Letters Patent for inventions, and the registration of patents, designs, trade marks and copyright, which the Minister of Justice formally introduced just before the recess. The Bill, as its title indicates, deals with four kindred, but separate, questions, and we shall discuss for the present only the chapter which brings into harmony the very diverse provisions of the Patent Laws now in force in the four Provinces. It may, however, be observed that the whole question has its Imperial as well as its South African aspect, and that the terms of the various chapters of the new Bill aim not only at securing uniformity within the Union, but also at bringing South African procedure and practice into harmony, as far as possible, with the procedure and practice of the rest of the Empire. Thus the new copyright provisions are, with such modifications as local circumstances compel, based upon the Imperial Act of 1911, which indeed is to become a corporate part of the South African law. Similarly the trade mark proposals follow closely the lines of the most modern legislation in Great Britain, Australia and New Zealand; and the patent legislation now projected will also embody many important provisions of the British law. The laws of industrial property in this country are so complex that owners of ideas invariably find it necessary to employ expert agents. If, for instance, an inventor wishes to-day to patent his invention in all the four Provinces he must go through all the forms required by the different laws in force in each Province; he must pay the various fees in each Province; and he must, as experience proves, employ agents in each Province. In the Cape the statutory fees total £37 4s. 6d.; in Natal, £20 19s.; in the Transvaal, £53 10s.; and in the Orange Free State anything from £30 to £70. When to these fees are added the costs of patent experts, it may readily be imagined that the patent system of South Africa is not calculated to encourage invention. The Bill will offer all reasonable facilities for opposition to patents, and definitely prescribed grounds for opposition are now laid down. As the *Cape Times* points out, the Bill straightens out a multitude of anomalies in detail which have arisen in this country in the course of years of divergent law. But it does much more than this. It introduces for the first time in South Africa some of the important provisions of the British Act of 1907 as to the non-working of patents and the issue of compulsory licences. This Act, which stands to the credit of Mr. Lloyd George, placed a most effective check on the system under which foreign manufacturers were enabled to take out patents in the United Kingdom without any intention of working them in that country. It enables British patents to be revoked when they are worked exclusively or mainly abroad, unless satisfactory reasons can be given why they are not worked in the United Kingdom. German firms, by taking out patents in Great Britain, had effectively prevented the establishment of competitive industries in the latter country, and Mr. Lloyd George's Act had the almost immediate result of compelling a number of German firms, who had up to that point worked their patents exclusively in Germany, to allow the working of their patents in Great Britain. Various important new industries thus became established in the United Kingdom. The Bill will be welcome as establishing property in ideas and inventions in South Africa upon a sound footing and removing the anomalies and inconsistencies of the existing laws.

PROGRESS OF THE "SAFETY FIRST" MOVEMENT.

Review of a Year's Activity—New Ideas and Suggestions—Issue of Safety Literature—Co-operation With Electrical Engineers.

Although the accident rate on the mines for 1915 may compare unfavourably with that for 1914, owing to the absence of many good men on active service, the year has not been without progress in the direction of accident prevention. The Safety First Committee of the Rand Mutual Assurance Company, Ltd., continues to carry on an active campaign on the mines, by means of circulars to the various managements, literature for free distribution to the men, the examination of new ideas and safety devices, and the publication of a monthly journal mainly devoted to the cause of accident prevention. *Inter alia*, there was issued a pamphlet of extracts from the annual report of the Department of Mines and Industries for the year 1914 by the Prevention of Accidents Committee of the Rand Mutual Assurance Company, Ltd., on the express recommendation of the Council of the Association of Mine Managers of the Transvaal. The extracts, which deal with accidents in the Transvaal Mines, especially the gold mines, are selected from the reports of the Government Mining Engineer and the Inspectors of the Johannesburg, Germiston, Boksburg, and Krugersdorp districts, and contain a careful analysis of the accidents which have occurred during the year under review, as well as defining their causes. It is felt that this valuable information might escape a considerable proportion of the officials on the Transvaal mines unless placed before them in a compact and accessible manner, on account of the voluminous nature of the annual report and the expense of procuring a copy. In the preface it is stated: "It is hoped that the officials will appreciate that this pamphlet is not issued in a spirit of criticism, but that the intention is to render assistance to them in their strenuous endeavours to reduce the accident rate on the mines."

Other Publications.

In addition, the Committee has issued a new edition of the "Extracts from and digest of those regulations referring to the duties of Underground Workers in the Witwatersrand Gold Mines." The booklet is distributed free and has been found invaluable for the purpose for which it is designed. There is also in the press a work by Dr. Irvine embodying extracts from "First Aid" instructions adapted to popular and general use on the mines. The "Prevention of Accidents" Committee is likewise endeavouring to secure the use of goggles by the workers underground, and are introducing a number of these invaluable articles for experimental purposes.

"Safety First" Tags.

Another device that may prove useful is the "Safety First" tag. The "Safety First" tag is used to some extent in America. On every mine there are many places which the manager, mine captain, engineer, shift bosses, foremen and others in authority see in their daily rounds where these tags might be placed warning workers of danger. Their use is more particularly intended for places where there is a special and temporary reason for the particular places to be avoided or for certain gear not being interfered with, such as electric switches, levers or other gear for starting motive power. Recent accidents could have been avoided had these tags been placed on a starting gear of a tube mill, the liners of which were being repaired, or on the valve of a boiler in which internal repairs were being conducted. The blank side of the tag is intended to be used for special instructions. A place is given for the date and the signature of the person affixing the card. The tag bears the Universal Danger Signal adopted by the Committee, the Skull and Cross Bones.

Accidents Arising from Electrical Causes.

According to the Government Mining Engineer's Report for 1914, the number of accidents on mines and works in the Union of South Africa arising from electrical causes was, happily, very small considering the extensive use of electricity, particularly on the Witwatersrand where very high voltages prevail. The total number of accidents was 16, involving the death of 7 coloured persons and injury to 7 white and 5 coloured persons. Of these accidents, mining was responsible for 9, involving the death of 4 coloured persons. The aim of the "Safety First" Committee is to reduce the chances of accidents from all causes to the lowest possible point, it is therefore investigating what further steps can be taken to prevent accidents resulting from electrical causes. In this connection, the managing secretary has written to all the mine managers asking to be furnished with the following:—(1) Copies of all instructions, regulations (other than Government Regulations), warning notices and other measures taken or in use on the mine for the prevention of accidents from electrical causes. (2) Short explanatory notes of any accidents which have occurred on the mine and which have been attributable either directly or indirectly to electrical causes. Upon receipt of this information it will be handed to the Safety Precautions Committee of the South African Institute of Electrical Engineers which is collaborating with the "Safety First" Committee of the Rand Mutual in investigating the prevention of accidents from electrical causes.

Southern Van Ryn Reef.

The following is the official description of the section cut by the No. 3 Borehole on this property:—

Surface to 45 feet, coal measures and dwyka. 45 feet to 590 feet, Nigel quartzites, very white in colour, with the following beds and special features at depths stated: 75 feet, small pebble reef, 6 inches; 81 feet to 88 feet, several small pebble reefs, 6 inches to 9 inches thick, with pebbles up to the size of hazel nuts; 116 feet, small pebble reef, 6 inches; 127 feet, small pebble reef, 4 inches; 127 feet, small pebble reef, 6 inches; 224 feet to 228 feet, Nigel Battery Reef, 4 feet thick, with pebbles up to size of large hazel nuts; 260 feet to 290 feet, grey dyke rock (intrusive); 304 feet, gritty quartzite, one small dark pebble in quartzite; 577 feet, quartzite not so white; 590 feet 3 inches, Nigel Reef —46 inches containing reef matter; 594 feet 1 inch, Nigel footwall shales; 596 feet, hole stopped. Nigel Reef assayed, top portion, 21 inches average 5 dwts., then 20 inches of dark quartzite with an occasional pebble ·5 dwt., then 5 inches footwall 5·2 dwts., then 4 inches footwall shale 2·3 dwts.

New Transvaal Chemical Co.

At the annual meeting of the New Transvaal Chemical Company last week, Baron E. B D'Erlanger presided. He stated the year's profits were £36,349, which was proof, he declared, that the company had turned the corner. He explained that Lever Bros. held all of the £150,000 worth of ordinary shares, which would carry with them all the surplus profits, after the £24,000 required for dividend on preference shares.

Position of The Sheba.

The secretary writes: I have to advise you that the tonnage crushed for the month of December was 7,031 tons, yielding 1,545 ozs. of fine gold. Working expenses amounted to £6,576, and expenditure on development to £2,100. The month's working resulted in an estimated loss of £2,500. This is due to the refractory nature of the bulk of the ore now being supplied to the mill. Measures have been decided upon which will enable better extraction results to be obtained, and an increased concentrating and roasting plant is now on order and will be installed within the next few months.

RAND METALLURGY IN 1915.

A Period of Enforced Caution—Refinement and Efficiency near the Limit—Levelling up Possibilities in the Future.

"At present in a well-equipped and adequate modern reduction plant, and at a cost well under the value of 1 dwt. of gold, a total residue worth only about 1s. per ton can be profitably obtained, which, on ore assaying 8 dwts. per ton in value, would be equal to an extraction of 97 per cent." The metallurgical position on the Rand is thus concisely summed up by Dr. Caldecott in an interesting paper, which was read last year at Pretoria, before the South African Association for the Advancement of Science. Dr. Bosqui, who contributed a paper on the same subject to the American Institute of Mining Engineers, shows how economically the reduction of Rand ore can now be effected, by pointing out that whereas the total average cost of ore treatment at the Modder B Mine, during the year 1913 was 3s. 6·07d. per ton milled, over a monthly quantity of 33,715 tons, the cost for similar processes at the same mine during the year 1914 averaged as little as 2s. 10·4d. per ton milled over an output of 42,000 tons per month. This charge began at the shaft head as the ore was received from the bins, and covered sorting and breaking, transport from crusher station to mill bins, stamp milling, tube milling, amalgamation and cyaniding, under all the separate and manifold headings of labour, stores, power, assaying, smelting, and the rest that legitimately make up the expenditure incurred in the recovery of the gold. It would seem that there is little opportunity left for further improvement, either in the direction of economy or in that of percentage of recovery. Metallurgy, as we understand its aim on the Rand, has been well-described as the art of making money out of ores, and if we accept this definition there is probably nothing worth mentioning that remains to be done. Progress is still being made in detail, however, and every element of cost that is susceptible of improvement will be made to contribute its share towards the lowering of expenditure and the increase of recovery, provided always that the additional effort is worth the money. This is the first and last consideration.

THE QUESTION OF CAPITAL COST.

Hitherto the margin of possible profit has been sufficiently wide to admit of additional capital expenditure being incurred in order to secure some of it; to-day progress is still possible from a purely mechanical and scientific standpoint, no doubt; but the question of final profit is putting limits upon inventive enterprise in proportion as the working margin is diminishing. The vast dimensions of the gold mining industry are such that even a small gain or loss is magnified enormously in its aggregate effect, however, and herein lie inducements for betterment which are not yet exhausted. For example, it has been shown that a penny, or, say, 0·02 dwt. of gold, per ton of ore milled on the Rand is equivalent to a total sum of about £100,000 on the yearly tonnage. On the larger mines the cumulative result of even slight economies are obviously well worth considering, so that although in the most up-to-date modern plants, efficiency in the full sense of the word has been pretty well attained in the metallurgical field, there are others where the knowledge already acquired may yet be usefully applied.

INDIVIDUAL POSSIBILITIES.

While, therefore, future refinements on the advanced and thorough practice of the best mines are not greatly to be looked for, the levelling up of those plants which are not of the most modern type is a work which has yet to be accomplished, and the total result is one that should materially add to the aggregate profit of the whole industry. There is a considerable amount of work for metallurgists and engineers in this field, for the improvements which have been effected upon some of the older reduction works during the past few years have shown that capital expenditure, which may be recouped in two or three years is, in many cases, sufficient, if carefully applied, to secure profits which are far in excess of the original sum incurred in the effort to obtain them.

EFFECTS OF THE WAR.

During the past year, then, little has been done in the metallurgical field of the Rand for reasons which will be apparent to everyone, apart from the fact that the war has hindered development in every direction. Such enterprise as may have been favoured in normal times has given way to caution and a strict economy, with a view to marking time rather than what is commonly known as "making the pace." The incidence of the war has been largely felt in the matter of supplies and not least in the matter of white labour. The absence of a considerable percentage of skilled, or, at any rate, trained men, has thrown a burden of responsibility upon the heads of departments which has been sufficient for the day, and schemes of betterment have, naturally, had to give way to plans for self-preservation. Even out of this unhappy state of things some good may come, for necessity has doubtless taught the metallurgist something in his own particular sphere of spending and saving as it has certainly taught every one of us in the domestic circle. As an example, we have the investigation into the loss of cyanide in working solutions, which has suggested itself during the last year or so, and has been pursued with great zest, to judge from papers and communications upon the subject which have been placed before the Chemical, Metallurgical and Mining Society. There has also been the practical work in connection with gold refining which was undertaken as a direct result of the war, when the prospect of a local minting of gold was under consideration. In both these enquiries there may lie the germ of improvements, which will add appreciably to the total profit of Rand reduction works. The extra charge, for instance, of one penny per ounce of bullion, which was imposed by London refiners some months ago, inflicted a burden upon the industry of no less than £40,000 per annum, while previous costs in connection with transport, insurance and refining of about a ton of bullion daily amounted to 1 per cent. of its value, or something like £350,000 a year. The electrical processes for the recovery of gold from cyanide solutions, which are being tried locally, have already been referred to. Nothing authoritative has so far been published with regard to them, although some definite success has been rumoured.

RECENT LITERATURE.

Those who wish to gain some idea of the position at which the metallurgy of the Rand has arrived cannot do better than read the above-mentioned paper upon the subject by Dr. Bosqui, which was read last year before the American Institute of Mining Engineers, and was published in the *South African Mining Journal* on the 19th June, and succeeding issues. Prominent Rand metallurgists were invited to contribute to the discussion, and we understand that some interesting papers were sent in accordance with this request. They have, however, not yet been published in the transactions; but will appear in due course. Another important paper to which reference must be made is that which was read by Dr. Caldecott before the South African Association for the advancement of Science last year, at the annual meeting in Pretoria. Each of these contributions to the literature of the subject pretty well establishes the point that reduction works practice on the Rand has reached a stage of theoretical and actual efficiency, which does abundant credit to those who have been responsible for the progress made, and leaves little room for expansion in the future.

Sir Lionel Phillips will sail for South Africa on a short visit on February 5. Sir Lionel Phillips, as chairman of the Central Mining and Investment Corporation, will be accompanied by Mr. Hugh Marriott, consulting engineer to the Central Mining Corporation in London.

PROGRESS OF THE MADAGASCAR OIL FIELDS.

Another and somewhat interesting stage in the progress of oil exploitation in Madagascar has been reached in the proposed—and, we understand, practically concluded—amalgamation between the Manambolo Oil Syndicate (Madagascar), Limited, and the Betsiriry Proprietary Oil Fields, Limited. The properties of the respective companies adjoin each other and are so situated as to lend themselves admirably to a scheme of this kind. It has long been recognised that the expense incurred in connection with the carrying out of drilling operations and exploratory work in Madagascar, is a matter with regard to which economy was not only desirable but possible, as far as the work of these two companies is concerned. The difficulty of coming to a satisfactory arrangement, however, has, until now, prevented the idea from maturing. Much of the expense incurred by an oil prospecting company operating in Madagascar is the initial expense consequent on the difficulty experienced in shipping to, and transporting from the coast, the heavy drilling plant which is required. To be taken in conjunction with this is the Customs duty on machinery, which is assessed by the pound weight, and is, therefore, extremely high. In view of these conditions there is an advantage to the combined companies in the fact that it will be unnecessary to bring much additional plant to the island, and that the money in hand will be more usefully employed in actual drilling. The Betsiriry Company possesses two excellent drilling rigs, both being located on the property. One of these has successfully bored to a depth of 1,050 feet, and has pased through strata which are considered by the drillers engaged to show indications which compare favourably with those of other oil fields in which they have gained experience. The Manambolo Company owns a powerful drilling plant capable of boring to a depth of 4,000 feet or more, and which, if transported to Madagascar would be the largest rig on the island. It is in the Cape Province at the moment, however, and will remain there until such time as it may be required in Madagascar. All the available money in hand will be devoted to work with the plant already in use. It is considered that the new scheme will benefit both companies greatly. The Mineral Oils, Ltd., of Capetown, has underwritten £10,000 of the original capital of the Manambolo Company, with the right to place a further £10,000 of the increased capital of the Betsiriry Company, the latter concern absorbing the other party to the undertaking. According to the original Betsiriry prospectus, issued in June, 1914, the nominal capital of the Betsiriry Oil Fields, Ltd., was £75,000, and the area taken up about 130 square miles. The directors were Messrs. J. Frank Brown, W. Kidger Tucker, Col. Donaldson, and Messrs. A. Macdonald and J. E. S. Billing. The ground held by the Manambolo Syndicate was reported about the same time to be equal to some 74 square miles. The nominal capital was £130,000, and Capt. Hugh Meyler was the chairman of the board.

PREMIER DIAMOND MINING COMPANY: ANNUAL REPORT.

A "Mark Time" Year—Prices Maintained—Future Policy.

The directors of the Premier Diamond Mining Company, Ltd., in their thirteenth annual report, state that owing to the contracted market for diamonds since the suspension of operations in August, 1914, it was not possible to resume mining and washing during the period covered by the accounts now submitted. The directors have been able to take advantage of the improved but limited demand for diamonds which set in early in 1915, and have disposed of a considerable portion of the stock on hand at the close of the last financial year. The revenue and expenditure accounts show the results of these sales after deducting the expenditure for the year. The directors are pleased to state that, as a consequence of an understanding with the other holders of diamonds, pre-war prices have been maintained. In view of the reduction in the stocks of diamonds held at the outbreak of hostilities and the increased demand, it has been decided to commence washing operations on a small scale, increasing or reducing the same from time to time, to meet the current market conditions, but some time must elapse before any fresh diamonds can be shipped and placed upon the market, when, it is hoped, the bulk of the existing stocks will have been absorbed. The directors record with satisfaction that it has become practicable to resume operations, and it is intended to limit the production to actual demand. In regard to future policy, the directors add:—"The conditions that must obtain for a considerable time after the cessation of hostilities make it imperative that much closer relations will have to be established amongst the great producers to limit the output and maintain and increase prices so as to assure reasonable profits."

Manager's Annual Report.

In the course of his annual report, Mr. D. McHardy, manager of the Premier (Transvaal) Diamond Mining Co., says:—

No pumping has been done, and the accumulation of water in the open workings of the mine since the cessation of operations in August, 1914, represents 150.000,000 gallons. The "make" of the mine does not exceed 150,000 gallons per diem, but this quantity has been considerably augmented by the inflow of storm water as the result of the heavy rainfall during the past season. As the water accumulated in the lower levels, all material likely to be damaged, if submerged, was removed to the 260 ft. level, where it will be comparatively secure, particularly in view of the board's decision recently to commence pumping operations on a small scale, in order to prevent the water rising above its present level. Notwithstanding the adverse conditions, it is interesting to note that very little reef has fallen from the walls of the pipe, and the rim rock generally, at all points on the surface, appears to be sound. The same remarks apply to the main haulage tunnel, which is intact throughout. The system of relief work inaugurated to meet cases of distress when mining operations ceased was discontinued in December last, when the majority of the men employed in that connection volunteered for active service in South-West Africa, only a few men being retained to guard the mine and plant. At the conclusion of the campaign, however, a number of employees were unable to obtain billets elsewhere on their return, and the board again decided to provide relief work for such cases. At the close of the financial year fifty-four men were employed, and it has consequently been possible to undertake a considerable amount of useful work principally in connection with the maintenance of the machinery and plant, certain sections of which have been thoroughly overhauled, advantage being taken of the opportunity afforded by the total stoppage of operations to carry out repairs and renewals of a nature which could not be conveniently executed under normal conditions. In addition to this, a plantation has been established on the farm Lousbaken containing 20,000 gum trees of a variety suitable for mining purposes. The amount paid in wages in connection with the relief work, including the allowances made to the dependents of the men on active service, was £20.500. During the past year a contract was arranged for the removal of the scrap iron and steel which had accumulated on the mine, and the revenue derived from this source to date amounts to £2,640. This work is proceeding, and a large quantity of disused material is still available for disposal. Pumping from the main station at the Wilge River has been carried out at intervals to meet domestic and other requirements, the total quantity of water consumed being 90,000,000 gallons. The plant at the pumping station has been maintained in a satisfactory state of repair, and the reservoir is full at the present time. The rainfall was 42·41 inches, compared with 19·14 inches for the previous year. The sum of £5,642 has been expended in purchasing privately owned property from employees who have severed their connection with the company during the period under review. The total number of dwelling houses on the mine now represents 622, of which 512 are owned by the company, the remainder being the property of employees. The fullest advantage has been taken of the concession granted by the board, allowing the families of men who have obtained temporary billets elsewhere, or who have volunteered for active service, to occupy the company's houses free of rent, in addition to which water, lighting and sanitary services are provided without charge. The European population at present is 850. The sale of sundry live stock and vehicles during the past year realised £450.

ORGANISING BRITISH ENGINEERING INDUSTRY.

Full Text of Important Report.—How German Trade Must Be Fought in Future.

We have received a report, drawn up by the Special Committee of the Engineers' Club of Manchester, in which recommendations for organising British engineering industry are submitted. These are an extension of and are based upon the recommendations of the sub-committee appointed by the Engineers' Club to consider the effect of the war on the engineering industry. The text of the report is as follows:—

The present is an opportune moment for the whole engineering industry of this country to reorganise and put its house in order. The development of our engineering export trade, in particular, has been highly unsatisfactory for some years, while Germany's rate of progress has been phenomenal. In our opinion, Germany's success has been due to education, to co-operation, and to organisation in manufacturing and selling, backed up by adequate financial support. In Britain, on the other hand, education has been unsystematic, organisation weak, and co-operation between competing firms almost non-existent. The time has come when every British engineer must realise that his British competitor in some markets must be his friend and ally in others. The spirit of conference and co-operation is needed to leaven that British independence which, despite its fine qualities, has hitherto hampered combined action in the interests of the British engineering industry as a whole. We do not advocate trusts or combines that enforce uniformity and stifle individual initiative. But we feel the urgent need for some voluntary organisation of the whole industry, based upon a recognition of the interests common to competing firms and common also to employer and employed; and we believe that, by voluntary organisation and co-operation a great deal can be done to improve manufacturing processes, to develop foreign trade, and to secure for employees better conditions of work and a larger share of the fruits of their labours. The capital invested in the British engineering industry is estimated at over 300 millions sterling. If firms representing this huge sum would co-operate and equip themselves for a determined and well-organised effort, there would be no question of their ability to secure a larger proportion of the trade of the world. Your committee is convinced that advantage can best be taken of the present opportunity by the formation of an association on a non-trading and non-interference-with-prices basis. This association should comprise British manufacturing concerns in all branches of engineering, aim at the inclusion of every such concern, have a constitution giving it a legal status framed on broad principles, and possess an efficient and energetic management. Such an association would speak with a powerful collective voice in matters with which Parliament was concerned, would assist the Government in questions connected with industry and commerce; and would be entitled to representation on the governing bodies of universities and technical colleges. The association would not trade in any way whatever. It would assist members equally and without distinction in the obtaining of business, and would generally act in the furthering of the interests of the industry as a whole. Ample funds should be secured from members, mainly in the form of annual subscriptions, not of uniform amount but according to a graduated scale. Thus an annual subscription, equivalent to one-tenth of 1 per cent. of the 300 millions capital, would provide an income of £300,000. The constitution of the association would require careful framing. Membership of the association would be restricted to approved British engineering concerns. A large majority, say, three-fourths of the beneficial owners of every company or firm, seeking to become a member, should be British subjects. The general management of the association should be in the hands of a thoroughly competent business man, of unimpeachable integrity, under the direction of a representative and periodically elected council. The headquarters of the association should be situated in London or Manchester. Branch offices may later be established at suitable centres in this and other countries. Where such branch offices are not justified the association may appoint, temporarily or permanently and for specific or general purposes, individual representatives, who would ordinarily be engineers of wide experience with an intimate knowledge of local requirements. The association's representatives should be in close touch with the British Consul, the Commercial Attaché, the Colonial Government, and the British Chambers of Commerce, and would do propaganda work in the interests of British engineering. The work of the association should be directed by the council through the general manager. Standing committees should be appointed by or elected from the council, including (if thought fit) co-opted members, in order to advise the council in regard to the following departments of the work, namely: (1) General purposes; (2) intelligence; (3) production; (4) inventions and patents; (5) publicity; (6) finance; (7) education and research; (8) Parliamentary. Special committees might also be appointed from time to time to deal with temporary or special matters. The functions of the standing committees should include the following:—

I.—*General Purposes.*—(1) To bring pressure to bear upon railway, canal and shipping companies for the improvement of conditions and reduction of freights. (2) To appoint arbitrators, or otherwise settle disputes arising between members. (3) To discharge such duties as may from time to time be assigned to it by the council.

II.—*Intelligence.*—(1) To control the association's representatives and to collect, analyse and distribute (through the publicity department) amongst members the technical and commercial information they obtain. (2) To analyse consular reports, technical and commercial papers and other published matter, and to circulate the results amongst members. (3) To receive specific inquiries for business and to forward these to—(a) Firms indicated if earmarked; or (b) all members concerned if not earmarked. (4) To arrange conferences of members interested, to discuss general policy and joint action in connection with prospective business. (5) To recommend the council and subject to its sanction to send out from time to time a commission to investigate matters of engineering interest in various parts of the world. (6) To recommend the council to make temporary appointments from time to time of individuals, whether members or not, who have special information or facilities, to report on particular fields, industries, or specific cases. (7) To give introductions. (8) To recommend suitable agents and make inquiries of a confidential character into the standing of firms.

III.—*Production.*—(1) To promote a better feeling between manufacturers to the mutual good. (2) To raise the standard of manufacturing methods and organisation, and with that object to direct the attention of manufacturers to engineering developments and improvements in workshop practice. (3) To stimulate manufacturers to adopt a progressive and enterprising policy, both in commercial as well as in technical and manufacturing matters. (4) To induce members to experiment continuously both on their own account and with the co-operation of other firms or outside institutions with a view to placing new or improved productions on the market. (5) To encourage a keener study and appreciation of customers' requirements, and a greater readiness to satisfy them—(a) By supplying goods somewhat outside their usual range of production; (b) by issuing comprehensive catalogues (see "Publicity"), and by sending abroad representatives with qualifications such as would be given by the training outlined under Section VII., 1-b. ii.; (c) by fulfilling promises especially of delivery. (6) To recommend members to consider the advisability of marking their goods "British Made."

IV.—*Inventions and Patents.*—To consider and make recommendations to the Parliamentary Committee respecting questions of practice under, and amendments of the law relating to Patents, Designs and Trade Marks.

V.—*Publicity.*—(1) To disseminate amongst members the information collected by the Intelligence Department. (2) To organise the preparation for distribution at home and abroad of printed information of all kinds relating to the British engineering industry for the purposes of increasing the demand for British products. (3) To organise schemes for advertising by means of exhibitions, show-rooms and otherwise at home and abroad. (4) To undertake the translation and adaptation of members' catalogues for foreign markets. It is urged that these catalogues—(a) should be translated into the language and units of the country concerned by native engineers so as to ensure the terms being technically correct and the descriptive matter adequate; (b) should be fully priced and coded, sufficient data being given to enable purchasers to estimate the cost of goods delivered to their destination.

VI.—*Finance.*—To secure and preserve a sound financial basis for the association. To make arrangements for the better financing of the industry, both in manufacture and in relation to home and foreign contracts. To consider recommendations submitted by other departments.

VII.—*Education and Research.*—(1) To advise Government Departments (Board of Education, Home Office, Civil Service Commission, etc.), local education authorities and the governing bodies of schools, colleges and universities in regard to the education of engineers of all grades; and to advise members in regard to the education of their employees; and in particular—(a) To nominate representatives of the association to serve upon the governing bodies—or upon advisory committees of the governing bodies—of universities and technical colleges of university rank. (b) To advocate—i. The establishment of new schools and colleges where required. ii. The provision of suitable courses in existing schools, colleges and universities, and especially the provision in certain universities of technical-commercial courses which, when combined with practical experience, shall prepare future commercial representatives of engineering firms to understand their customers' interests, the conditions of language of the country in which they trade, the merits and uses of their goods, so that they may undertake successfully the selling part of engineering business. iii. The co-ordination of all schools and colleges in which engineers are educated; and, in order that this co-ordination may be effected and the system thus formed thoroughly democratic: iv. The establishment of an adequate system of scholarships and bursaries so as to secure that no person, who, if he passed through a certain course, would be needed and demanded to fill some place in the engineering industry, should be prevented from taking that course for want of a scholarship or maintenance allowance. (c) To encourage members in each area to establish, in co-operation with the education authorities of the district, a scheme for the advancement of apprentices and to urge every member to provide at least such minimum means for encouraging apprentices as are prescribed by the scheme in force in their district. (2) To encourage research in the following among other ways: (a) By making recommendations to the finance committee in regard to money grants to universities, technical colleges of university rank, and other institutions. (b) By moving the Parliamentary Committee to secure adequate Government grants for purposes of industrial research. (c) By undertaking, and recommending the financing of, particular researches in co-operation with universities and colleges. (d) By advising members in regard to particular researches or tests which they may wish to undertake, or to have undertaken on their behalf, in the research or testing laboratories of some central university or college. (e) By developing co-operation between engineering firms on the one hand and universities and technical colleges on the other (see Section III., 4), so as to establish such "Schools of Thought" as exist in the research departments of great Continental and American engineering firms, but cannot be fostered in the comparatively small establishments (and smaller research departments) of most British engineering firms.

VIII.—*Parliamentary.*—(1) To induce the Government to take an active interest in trade in general, and engineering in particular, to bring pressure to bear on it, to create a Ministry of Industry and Commerce (the permanent secretary of which should be a man of great commercial experience and distinction), and to allocate to this department the purely commercial matters now handled by the Board of Trade. (2) To induce the Government to reorganise the Consular service so as to increase its utility to British trade, and in particular to appoint, as commercial attachés, men who have had a wide commercial training and experience; when possible and desirable, to obtain the appointment of engineers of recognised standing as advisers to the national representatives abroad; wherever possible to appoint natural-born British subjects as Consular officers, and to make the service a special medium for the furtherance of British commercial interests, *e.g.*, by the active dissemination of information, in the language of the country, concerning British industries and products. (3) To advise the Government on engineering matters when called upon to do so, and to tender advice to the Government on such matters in proper cases. (4) To deal with recommendations from the Inventions and Patents Committee and to take action thereon when necessary or advisable. We have endeavoured in this report to outline what we believe to be the best way of advancing the interests of the British engineering industry. The multiplication of organisations is undesirable, and if an existing association would so modify its constitution and extend its operations so as to give effect to our suggestions, it would be better than to establish a new association. The whole-hearted support of the industry and adequate financial backing would ensure the success of the proposed organisation. The objects for which your committee have laboured will be secured if every British engineer approaches the matter in a spirit of true patriotism. Your committee, therefore, recommends an association on the lines indicated in this report to the serious consideration of the Engineers' Club.

Daniel Adamson.
H. Allcock.
W. T. Anderson.
J. A. F. Aspinall.
W. A. Bristow.
J. M. Dale.
Edward W. Donovan.
J. C. Maxwell Garnett.
Edmund L. Hill.
J. H. Hoseason.
E. T. Morland Johnson.
George G. L. Preece.
H. Derwent Simpson.
Eustace Thomas.
W. Walker.
H. T. Wilkinson,
Hon. Sec. to Special Committee.

LABOUR AND INDUSTRY: OFFICIAL MONTHLY REVIEW.

Report for December on Conditions at Chief Centres in the Union.

The report issued by the Department of Mines and Industries for the month of December shows that employment was found in Johannesburg for 21 persons, a decrease of 11 compared with November, in Capetown for 63 against 57, in Pretoria 132 against 64, and in Durban for 45 against 29.

Johannesburg Conditions.

Dealing with Johannesburg the report states: Building operations are very quiet, and to all appearances there are few indications of expansion, and the class of buildings, with few exceptions, is not expensive. Twenty-nine per cent. of the applications for employment during the month are from men connected with the building trades. The engineering shops are, on the whole, well supplied with orders, and workmen in the different branches are well employed. There are openings for good moulders. Very few skilled men in the engineering trades need be idle. In leather goods the boot and shoe trade is making headway, and new workshops are coming into being, while others are increasing machines and staff. Billets vacated by those who have gone to the front have, in many cases, had to be filled, and the vacancies thus created have relieved the situation to a considerable extent. The reports on the various trades state that the furniture trade is continuing quite brisk, that the printing trade has improved somewhat, but has not come up to normal conditions; that employment for bootmakers is good, there being openings for good hands in machine work and heavy miners' boots, also for learners; that tailors have had a fairly busy season, but not up to the average; that harness-making has been better, but not to be compared with the demands this time last year; that the motor car trade is finding work for additional hands in repairing; and that electrical engineers are fairly well employed.

Pretoria.

The Superintendent of the White Labour Bureau, Pretoria, states that the increase in the demands from employers in mining, engineering, and clerical was due to the vacancies created by the departure of men for active service. It should be noted, however, that the majority of the posts offered were of a temporary nature. The following particulars regarding the Silverton Tannery may be of general interest. Some 350 yards of rails connecting the factory with the private siding at Silverton Station have been laid; fifteen soaking pits and 48 tanning pits are in use; buildings with suitable plots of ground for the accommodation of the workpeople are nearing completion; about two-thirds of the machinery, ultimately to be erected, is in working order; a considerable quantity of leather has been marketed already, and large numbers of sheepskins have been supplied for winter coats for the troops in Europe; on completion of the works and buildings, which will include a large boarding house and recreation and reading rooms, employment will be available for twenty to thirty whites and about fifty natives in addition to a number of youths under a scheme of apprenticeship which the proprietor is formulating; the area covered by the tannery and yards when completed will be about ten acres, while the total cost of buildings and machinery will be about £20,000; the motive power on the property is derived from suction gas, which also generates electric power; steam power is also used; all raw material required will be of South African growth or manufacture; the charcoal used at present comes from the Waterberg district, where it is made by poor whites, the Berg bark comes from the same district, wattle bark is at present coming from Natal, but will shortly be obtained from the Lydenburg district. Reporting on trades, the Superintendent states that the activity of the engineering trades has been sustained; that the building trades are generally dull, the supply of artisans being considerably in excess of the demand, and that in clerical and semi-professional offices there has been an increased demand for persons of both sexes to fill vacancies created by the departure of employees for active service. Respecting domestic occupations the report says: The demand for female white servants continues to exceed the supply. Although the returns show an increase in the number of applications for this class of employment, lack of experience combined with a disinclination to accept the terms offered by employers make it very difficult to place the girls.

Durban and the Cape.

Durban reports a slight improvement in the market during the month owing to the demand for unskilled labour from Kynoch's, but the demand in other quarters had not been brisk owing to the holidays. There had been a greater number of unskilled labourers applying than skilled workmen. As regards female labour there had been no demand for clerks and most applicants registered as waitresses in tea rooms. The amount of money distributed in relief by the local War Relief Fund continued to decrease. The Cape Peninsula report says the general demand for labour showed considerable improvement during the month, and several trades which had been in a depressed condition, notably woodworking, decorating and stone-dressing, showed signs of revival. The building trade remained dull. At the employment office there was a noticeable decrease in the number of casual workers registering their names, and a similar falling off in the number of skilled artisans seeking employment. Charitable societies reported a remarkable falling-off in applications for relief, and these came from people with serious moral or physical defects who could not obtain work. The following is the estimated value of buildings, the plans of which have been approved by the several municipalities during December: Johannesburg, £42,567; Benoni, £6,800; Boksburg, £1,335; Germiston, £4,965; Krugersdorp, £765; Roodepoort, £5,350; Pretoria, £9,438; Springs, £1,200; Capetown, £9,755; Sea Point, £8,560; Woodstock, £7,030; Rondebosch, £1,075; Claremont, £5,845; Kolk Bay, £2,035; Kimberley, £2,150; East London, £1,716; Durban, £16,133. In addition tenders were accepted for public buildings to the value of £17,250.

TRANSVAAL GOLD OUTPUT FOR 1915.

Increase of £3,039,386—£130,099 Below Record of 1912—December Returns.

Last year the Transvaal Mines produced 9,033,671 ozs. fine gold, valued at £38,627,461. This is 715,532 ozs., value £3,039,386, better than the total for 1914, and 30,628 ozs., value £130,099, less than the record production of 1912. The totals for the past fifteen years are as follows:—

	Ozs.	£
1901	238,994	1,014,687
1902	1,707,661	7,253,665
1903	2,955,749	12,589,248
1904	3,779,621	16,054,809
1905	4,897,221	20,802,074
1906	5,786,617	24,579,987
1907	6,451,384	27,403,738
1908	7,052,617	29,957,610
1909	7,280,545	30,925,788
1910	7,533,843	32,001,735
1911	8,237,723	34,991,620
1912	9,124,299	38,757,560
1913	8,794,824	37,358,040
1914	8,378,139	35,588,075
1915	9,093,671	38,627,461

The gold produced last month totalled 781,111 ozs., value £3,317,949, as against 781,013 ozs., value £3,317,534, for November, an increase of 98 ozs., value £415. The December total is not quite so good as was expected, mainly owing to a substantial falling off in the returns of the East Rand Proprietary Mines (£20,530), Princess Estate (£4,059), Village Main Reef (£4,303), and Witwatersrand Deep (£4,477). The number of stamps in operation on the Transvaal fields last month was 59 less than in October, although there was very little change in the native labour position. The official output figures for December as compared with those for November are as follow:—

Witwatersrand.

	Ozs.	Value. £
December	755,101	3,207,464
November	753,605	3,201,112
Increase	1,496	6,352

Outside Districts.

	Ozs.	Value. £
December	26,010	110,485
November	27,408	116,422
Decrease	1,398	5,937

Grand Total.

	Ozs.	Value. £
December	781,111	3,317,949
November	781,013	3,317,534
Increase	98	415

The Witwatersrand returns for December show an increase of £6,352 over those for the shorter month. The daily average yield in December, taking it as a 31-day month, was £103,466, as against £106,763 in November, a decrease of £3,237. It must be remembered, however, that the batteries were idle on Christmas Day. Substantial increases are shown by the following companies: Aurora West (£3,024), Ferreira Deep (£4,201), Modder B (£7,535), New Modder (£11,222), Roodepoort United Main Reef (£5,115), and Village Deep (£3,203). In December the group profits totalled £896,237, showing an increase of £10,845 compared with the total for November. The outside mines show a total decrease of £5,937. Of the principal producers the Transvaal Gold Mining Estates and the Sub-Nigel show an increase of £1,241 and £1,130 respectively, while the Nigel returns a decrease of £1,346 and the Sheba total is £2,586 below that for November.

Stamp Position.

In December 10,025 stamps were dropping on the Transvaal goldfields as against 10,084 in November, a decrease of 59. The official figures are as follow:—

	Rand.	Outside.	Total.
December	9,495	530	10,025
November	9,530	554	10,084
Decrease	35	24	59

Native Labour.

At the end of December the number of natives employed by the W.N.L.A. and contractors was as follow:

Gold mines	209,438
Coal mines	9,309
Diamond mines	132
Total	218,879

For the three months the figures are:—

	Oct.	Nov.	Dec.
Gold mines ...	210,017	210,068	209,438
Coal mines ...	9,513	9,432	9,309
Diamond mines	——	——	132
	219,530	219,500	218,879

Individual Returns.

The following are the returns of the Witwatersrand mines:—

	Ounces.	Value. £	Inc.	Dec.
	Ounces.	Value. £	Inc.	Dec.
Aurora West	4,305	18,286	3,024	—
Bantjes	5,646	23,983	1,381	—
Brakpan	20,991	89,164	506	—
City and Suburban	12,140	51,567	471	—
City Deep	29,208	124,068	73	—
Consolidated Langlaagte	16,469	69,956	421	—
Consolidated Main Reef	10,578	44,932	1,495	—
Crown Mines	65,441	277,976	6,164	—
Durban Roodepoort	3,235	13,741	—	1,037
Durban Deep	8,697	36,942	1,843	—
E.R.P.M.	49,293	209,383	—	20,530
Ferreira Deep	24,537	104,226	4,201	—
Geduld	9,887	41,997	—	272
Geldenhuis Deep	17,757	75,427	13	—
Ginsberg	4,100	17,416	—	55
Glencairn	3,483	14,795	391	—
Government Areas	15,721	66,779	—	2,570
Jupiter	5,895	25,040	1,610	—
Knight Central	7,421	31,522	—	578
Knights Deep	20,160	85,634	981	—
Langlaagte Estate	13,993	59,438	922	—
Luipaardsvlei	5,484	23,295	—	951
Main Reef West	6,607	28,065	—	688
May Consolidated	2,719	11,556	277	—
Meyer and Charlton	8,087	34,351	505	—
Modder B.	24,144	102,557	7,535	—
Modder Deep	14,915	63,355	—	136
New Goch	6,705	28,481	187	—
New Heriot	5,774	24,526	488	—
New Kleinfontein	16,580	70,427	823	—
New Modder	27,673	117,547	11,222	—
New Primrose	4,074	17,305	480	—
New Rietfontein	86	365	—	234
New Unified	3,372	14,323	131	—
Nourse Mines	16,277	69,140	637	—
Princess Estate	6,889	29,263	689	—
Randfontein Central	60,159	255,539	—	4,059
Robinson Gold Mines	17,392	73,876	—	2,417
Robinson Deep	19,214	81,616	1,313	—
Roodepoort United Main Reef	9,288	39,453	5,115	—
Rose Deep	19,423	82,504	—	2,901
Simmer and Jack	17,589	74,713	161	—
Simmer Deep	13,296	56,478	562	—
Van Ryn Gold Mines	11,036	46,878	—	437
Van Ryn Deep	19,121	81,221	—	1,614

Village Main Reef	1,835	7,795	—	4,303
Village Deep	18,535	78,732	3,203	—
Vogelstruis Estate	3,321	14,107	—	1,070
West Rand Centrals	455	1,933	—	480
Witwatersrand Consolidated ...	9.249	39.287	—	786
Witwatersrand	12,687	53.891	—	990
Witwatersrand Deep	12,006	50.998	—	4.477
Wolhuter	10.584	44,958	1.342	—
Miscellaneous	—	6.663	—	1.221

OUTSIDE DISTRICTS.

Nigels	3.165	13.444		1.346
Sub Nigels	3.969	16.859	1.130	—
Barretts	313	1.330	127	—
Sheba	1,544	6.559	—	2.586
Worcester	760	3.228	—	489
Glynns	1,632	6.932	72	—
Transvaal G.M. Estates ...	7.382	31.357	1.241	—
Quest	684	2,905	199	—
Fairview	736	3.126	191	—
Rietfontein	41	174	—	964
Miscellaneous	—	24,571	—	3.512

GROUP PROFITS.

Following is a list of the profits returned for October, November and December:—

	October.	November.	December.
Central Mining	£242,026	£228,784	£237,505
Rand Mines	194,959	174,236	190,253
Gold Fields	76,316	78,724	82,278
East Rand Proprietary ...	57,023	53,046	32,618
Kleinfontein	23,023	22,304	22,606
Barnato	129,397	130,590	128,328
Albu	67,539	62,644	66,861
Neumann	51,796	53,488	52,129
Mines Selection	33,111	32,330	32,562
Goerz	50,393	51,246	51,007
Totals	£925,585	£885,392	£896,237

CENTRAL MINING.

	October.	November.	December.
New Modder	£58,431	£59,119	£71,321
Robinson	37,197	35,047	33,949
Village Main Reef	*4,239	*10,062	*15,383
Bantjes	2759	130	986
City Deep	60,501	60,440	60,503
Village Deep	25,197	25,521	23,761
Modder B	64,182	56,589	62,368

*Loss.

RAND MINES.

	October.	November.	December.
Crown Mines	97,331	81,776	87,584
Durban Roodepoort Deep .	5,664	4,462	4,720
Ferreira Deep	43,031	38,911	45,380
Geldenhuis Deep	13,830	14,517	15,097
Nourse Mines	13,289	10,269	14,008
Rose Deep	21,814	24,235	23,464

GOLD FIELDS.

Knights Deep	16,184	15,189	15,509
Robinson Deep	25,087	26,314	26,004
Simmer and Jack	29,069	28,566	26,483
Simmer Deep	2,441	3,145	5,091
Sub-Nigel	3,536	3,012	4,003
Jupiter	*315	2,463	4,188

* Loss.

EAST RAND PROPRIETARY.

Angelo, Cason, Driefontein, New Comet ...	57,023	53,046	32,618

KLEINFONTEIN GROUP.

New Kleinfontein	23,023	22,304	22,606

BARNATO.

Consolidated Langlaagte ...	28,123	28,627	27,633
Ginsberg	4,039	3,552	3,672
Glencairn	2,656	2,321	2,057
Government Areas	16,059	17,253	16,252
New Primrose	5,016	3,901	3,742
New Unified	5,006	4,729	4,606
The Quest	227	206	292
Van Ryn Deep	43,061	45,045	45,067
Witwatersrand	25,210	24,956	25,007

ALBU.

Aurora West	3,122	1,714	4,150
Meyer and Charlton ...	20,831	19,918	20,520
Roodepoort United M.R. .	2,066	3,442	6,166
Van Ryn	19,647	19,689	17,703
New Goch	8,573	7,053	8,125
West Rand Consolidated .	13,300	10,836	10,196

NEUMANN.

Wit. Deep	16,050	16,631	16,038
Consolidated Main Reef ...	13,934	14,312	14,587
Main Reef West	3,869	4,198	3,805
Knight Central	4,053	4,401	4,161
Wolhuter	13,920	13,951	13,738

CONS. MINES SELECTION.

Brakpan Mines	33,111	32,330	32,562

GOERZ.

May Consolidated	1,032	1,081	1,189
Princess Estate	697	1,006	1,039
Geduld	14,195	14,004	14,118
Modder Deep	34,559	35,155	34,661

MONTHLY RETURNS.

The following table gives the monthly returns for 1912, 1913, 1914 and 1915:—

	Ozs.	Ozs.	Ozs.	Ozs.
January	737,060	789,390	651,753	714,984
February	703,886	734,112	626,261	676,229
March	*830,723	790,552	686,801	753,935
April	737,660	784,974	683,877	744,080
May	779,662	794,306	720,229	763,548
June	753,936	747,077	717,926	755,280
July	766,338	655,389	732,485	770,355
August	764,737	728,096	711,918	778,763
September	747,893	706,186	702,170	776,750
October	768,681	718,431	733,746	797,631
November	757,837	678,486	715,836	781,013
December	776,406	672,815	695,137	781,111

* Including gold reserves extinguished.

Rooiberg Minerals Development Co.

Appended are details of the operations on this company's property for December:—Stamps, 10; days (24 hours) concentrating plant ran, 26·17; tons milled, 3,226 short tons; concentrates, 85 long tons; average assay value metallic tin, 69·16 per cent.; estimated profit, £2,683 2s. 6d.; adjustments in respect of previous shipments, to be subtracted, £132 18s. 8d.; profit declared for the month, £2,550 3s. 10d.; net capital expenditure, £502 3s. 2d. The sum of £2,248 0s. 11d. has been included in working costs for the month in respect of shaft sinking, exploration and mine development. The average price of metallic tin, on which the month's revenue has been determined, is £169.

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Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Dr. Mellor's East Rand Geology.

A POETICAL CRITIC.

To the Editor, *South African Mining Journal.*

Sir,—I see that you have reprinted Dr. Mellor's paper on East Rand geology. As it appears that neither Dr. Mellor nor his believers will consider any ideas on the subject which may be put forward by those who cannot agree with him either as to his observed facts or as to his conclusions, but have endeavoured hitherto to discuss the subject on the lines of reasoned argument, the only thing left is to try a little satire. I send you the following in the hope that it may help to add to the gaiety of the mining community without seriously hurting the feelings of so eminent a scientist.—Yours, etc.,

W. BLELOCH.

Johannesburg,
January 10th, 1916.

See Dr. Mellor's East Rand maps,
Where mighty faults fill up the gaps,
And quartzites, shales and reefs are shown,
All broken, tortured, tossed and thrown,
Until a picture they present
Like those which Cubists' souls torment.
All save one Reef—one Sacred Reef—
Which never seems to come to grief;
Its brother beds may all be gone,
This Reef survives, and it alone,
By all these mighty faults unshaken,
The Reef is by the Doctor taken
Through miles of mines, where shaft and headgear
Stand silent witnesses of failure;
No mills nor dumps this stretch disfigure—
The gold has not been here *de rigueur*—
But presto! when Benoni's near,
The mills and dumps again appear.
So on it goes as far as Nigel,
Indeed, it might proceed to nigh——well
Just here its ghost's all one relies on,
The Reef's become a mere "horizon"—
Sufficient for strong faith to live on,
But rather thin to feed a mill on,
The faith of our own Special Pleader
In his Immortal Main Reef Leader.

Karroo Coal Prospects.

To the Editor, *South African Mining Journal.*

Sir,—Mr. Mills Davies sees fit to again criticise and adversely comment on the information furnished you regarding the most recent discoveries of coal in a locality where it will have, if development is satisfactory, such an important bearing and far-reaching effect on the future of this country and the Western Province in particular; in fact it is hardly necessary to point out to your readers or those who have the interests of the British Empire, and South Africa in particular, at heart, what it would mean to have Capetown as a coaling depot with coal mines within about 200 miles of the port instead of it being necessary to carry it as at present by long railway journey or by boat from Natal. Further, I think you will agree with me that it is the duty of every true South African to endeavour to develop and bring into prominence the resources of this country, rather than adversely comment on, without personal knowledge of, an undertaking on which much sound prospecting work has been done, and in regard to which the owners have carefully avoided publishing any information until they could make certain, from the results of their prospecting operations and from opinions expressed by prominent men visiting their property, that of its kind their undertaking was thoroughly sound and fully justified inviting the public to assist financially in its development. That there are different opinions regarding the correlation of the Transvaal and the Karroo coal measures is well known; I prefer, however, as the result of my own personal investigations to accept the opinion of the man who, as he says, has spent many years of research in South Africa, which opinion is expressed in August, 1906; about the same time, to quote from Mr. Mills Davies' letter, Mr. Mellor says: "A summary of the evidence bearing upon the question of the correlation of the Transvaal coal measures, shows, therefore, that the important question of the position of this series in the general Karroo sequence in South Africa cannot be said to be definitely settled." Further, in order to make the position quite clear, it is necessary to quote again from his letter:—"Schwarz says there is no correlation between the Transvaal coal beds and the carbonaceous shales above the dwyka conglomerate in the Cape Colony"; and after explaining that the dwyka shales exposed on the flanks of the mountains in the southern districts are beds which were originally deposited in the deeper central portion of the Karroo lake, he adds:—"This disposes of the theory that the carbonaceous beds of the upper dwyka shales may, in the deeper portions of the Karroo, become actually coal-bearing, etc." (*vide* "South African Geology," ed., 1912). In the face of this, however, coal of excellent quality has now been found in the deepest part of the Karroo basin with the strongest evidence of the existence of coal measures extending over a very large area. That it is coal, has been absolutely and definitely proved, and notwithstanding the unusual nature of the occurrence, prospecting has established the fact that it comes from below, having by distillation and pressure been forced into the extensive lines of fissuring where it is now found. Further, the evidence from the work done is that these lines of fissuring contain valuable coal resources independent of the main seam or source from which they derived their filling, and owing to the regularity in strike and dip, also the clean nature of the coal, there is every indication that it can be mined on a sound economical basis. I note that Mr. Mills Davies is now speaking of the material in question as a carbonaceous material instead of Grahamite or Manjak (bitumen) as heretofore; if, however, he had compared the analyses of coal and bitumen, he surely would not have made such a statement and if he is, in face of my definite statement on this point, still unconvinced, perhaps he will take a sample of the coal, analyse and test it for himself and further, before raising geological contentions on a subject of such vital importance, I would suggest that he make a personal inspection of the area and district under discussion. He might then, perhaps, be able to speak with authority as to the soundness or otherwise of different opinions. One thing is certain, that the source from which the coal comes and the existence of payable or otherwise coal measures can only be proved by boring, and exploratory work in depth on the coal filled fissures. The prospecting work has been laid out in order to prove and has clearly demonstrated that such work is fully warranted by the remarkable continuity over a very large area of such excellent coal.—Yours, etc.,

ARTHUR L. CHAMBERS.

Johannesburg,
8th January, 1916.

Defunct Companies.

To the Editor, *South African Mining Journal.*

Sir,—I should deem it a favour if you could inform me whether any of the following shares are still of any value, as I am unable to trace any of the companies in any more recent directory than that of 1910:—Eastern Extension Mining and Exploration Co., Ltd., Pretoria Proprietary Diamonds, Ltd., Regent A. Diamonds Prospecting Syndicate, Rhodesian Pioneers, Ltd., Clark's Zoutpansberg Exploration Gold Mining Co., Louise Gold Mining Co., Eclipse Gold Mining Co., Berea Developing and Exploration Syndicate, Eleazor Gold Mining Co. Thanking you in anticipation.—Yours, etc.,

W. L. NORTH.

P.O. Box 74, Withbank, Transvaal,
10th January, 1916.

[As far as we know, all these ventures are in liquidation, but some of our readers may be able to throw light on them. —Ed., *S.A.M.J.*]

Potentialities of the Far East Rand.

PLEA FOR DORMANT MINES.

To the Editor, *South African Mining Journal.*

Sir,—By virtue of my twenty years' experience as a prospector in the Far East Rand district, I am egotistic enough to reassert my unflinching belief that the future prosperity of South Africa depends largely on the success attending this district. Nay, I will go further, and hazard the opinion that the world's gold contributed by the British dominions in time to come will reach the phenomenal dimensions of four-fifths, instead of two-thirds as at present, and that the Far East Rand will be responsible for this desirable consummation. The wide expanse of payable reef-bearing country—if the unqualified success attending the developments of properties in the zone is any criterion—knows no bounds and may run into tons of thousands of claims. It may be argued that fabulous sums will be required for their exploitation, but I am bound to say, when the European crisis is past, millions of money, including that of America will be tumbling headlong to participate in the innumerable new ventures that must arise phoenix-like in the future; and how much more forcibly do my remarks apply to the many dormant mines on which so much preliminary work has been achieved, and where so much less money will be required to bring them to the producing stage; therefore, I would again urge upon the controllers of such "closed down" mines as the Cloverfield, Rand Klip, and Daggafontein (which are known to possess such magnificent prospects) to restart work as soon as possible, which by doing so would give an impetus generally to enterprise where virgin ground was concerned. It seems to me incomprehensible that the three dormant mines referred to have been " hung up " so long, as I feel confident in each case we shall find on further development the existence of another Modder B., or a Van Ryn Deep, and that the raising of capital (even in these bad times) for their " resurrection " would not alone be justified but would repay their sponsors tenfold, and adequately reward shareholders who have held stock (at very high prices) for so many years past. Another important factor, *apropos* of the Far East Rand potentialities, is that the Government ought to feel relieved at the thought that these areas are going to lighten their burden enormously and make it possible for them to eventually reduce their national debt materially and lighten taxation. I doubt if there is another part of the world where a Government possesses such an asset, which it is hoped they will eventually utilise and work themselves—money for which could be raised by special loans.—Yours, etc.,

E. L. E.

Benoni,
11th January, 1916.

Government Mineral Leases.

To the Editor, *South African Mining Journal.*

Sir,—I am glad to learn that the National Party are turning their attention from the disintegrating and suicidal policy of racial segregation and are devoting themselves to the truly national policy of developing the mineral resources of the State On lines such as these they can justly claim the approval of a large number of South African born citizens who, like myself, are of British descent and are desirous of perpetuating all that is inspiring in British institutions and British ideals. The racial antipathies of the National Party, and the class hatreds of the Labour Party, which seem to have some sort of mutual attraction, may well be dropped by each of them in favour of the more fruitful and very necessary work of constructive economics. Coming now to the question of the gold assets of the further East Rand, which it is the ostensible aim of the Nationalists to open up for the public benefit, it has already to be recognised that the methods adopted by Government, in accordance with the terms of the existing law, have proved a complete failure. We have come to a deadlock, in short. The several areas which have been offered for tender are subject to conditions that have been modified from time to time in order to make the propositions more acceptable to the financial groups. The Government has nothing more to suggest in the way of suitable terms, apparently, and it is understood that reasonable suggestions have been invited from the capitalists. They have none to offer, it seems. That is scarcely to be wondered at. People who have been accustomed to allotting themselves, as vendors, anything up to 70 per cent. of the nominal capital of the companies they have promoted cannot easily accept the legal principle that commissions and bonuses of any kind are not to be allowed in dealing with the mineral assets of the State, and that the guarantor shall have no advantage, in the matter of taking up shares, over the ordinary subscriber. As a matter of fact he has, but not with the official cognizance or consent of the Government. There can be no doubt, I think, that the promoters of the Government Areas recouped themselves to a considerable extent when the concern was floated. It was a perfectly natural and wise thing to do, but it is not certain that it could be done again, to anything like the same extent. The scheme was quite a new one, and the association with it of the Government sanction and, as many thought, of a sort of official guarantee, to say nothing of the powerful standing of the Barnato group, led to a public demand for shares that was quite enthusiastic. Since them the whole business has been carefully studied and a certain amount of experience has been gained, with the result that the proposition stands in a less glowing light than it did at the outset. What is the position of the Government Areas to-day. In the first place interest has been accumulating on the capital subscribed, so that the whole must amount to a very large sum over and above the cash actually invested. Some £702,500 out of a total required capital of £1,400,000 was paid in during March, 1910, or thereabouts, that is to say, some six years ago. Assuming a dividend not later than twelve months or so from now, the period over which the capital referred to has been increasing at compound interest, will be say seven years, and the amount at the end of that time will be, at the comparatively low rate of 7 per cent., roughly £1,130,000. Since then the remainder of the capital of £1,400,000 has been subscribed, so that in one way or another the amount of principal and interest may be taken, at the same date, to have reached a sum well over £2,000,000. Inasmuch as additional funds have been required to meet the expenditure of enlarging the reduction plant and for other purposes, we may assume, I think, that the total sum upon which it will be necessary to calculate dividend distribution and other disbursements will be approximately £2,500,000, or at least £1,000,000 in excess of the capital originally stipulated for in the lease. *The Statist* has lately been considering the matter of profits, and on the basis of a recovery of 25s. per ton milled, with a working cost of 17s. 6d. per ton—quite reasonable figures, by the way—has estimated that the annual profit accruing to the company on the enlarged plant will be £276,375. A dividend of 12½ per cent. on an assumed capital of £1,900,000 would absorb £237,500 of this amount, leaving a surplus to be dealt with in other ways. It would be impossible to pay 12½ per cent. on my figure of £2,500,000. In order to leave the surplus indicated by *The Statist* it would be necessary to pay only 9½ per cent. If one leaves the appreciation of the shares out of the calculation it will be seen that this is not a particularly high rate for a Far East Rand enterprise. At a price of £1⅓, which is not the highest figure that has been quoted at one time or another, the rate falls to about

7 per cent., which is not attractive for a mining investment nowadays. The journal in question proceeds to estimate the profit on the basis of 30s. recovery and 17s. 6d. working cost. This would allow of a dividend of 17½ per cent. on £1,900,000. The ratio of profit to recovery in this case, however, would be 41·6 per cent., and on a 30s. recovery the company would do quite as well for itself if the working cost were as high as 20s., and unless it could reduce its costs to at least 18s. on the same recovery, in one jump, it would be doing better for itself to keep them at 20s. per ton milled. Between 18s. and 16s. would be a profitable and practicable range of working costs, as far as the company is concerned; anything outside these limits, except at 20s. and over, would be disadvantageous. Herein lies the supreme absurdity of the sliding scale, and the Government would act wisely and justly in modifying the conditions and making them more in accordance with common sense and the enterprise of the company itself. However, this is something of a digression. The point I wish to make is that the experience so far gained from the opening up of the Government Areas is not such as to encourage capital to exert itself over much, if at all, in the endeavour to secure the ground upon terms which are likely to be acceptable to the Government. Supposing that a 10 per cent profits tax only were accepted, which would practically mean the abandonment of the principle that the Far East Rand, like diamond mines, should pay a special royalty by virtue of the ownership vested in the State. On the basis of the figures put forward by *The Statist*, on the lower yield, a profit per ton milled, namely, of 7s. 6d. per ton and a yearly output of 1,100,000 tons, the total working profit would be equal to £412,500, leaving a sum of £371,250 after deducting the profits tax. Assuming further that 80 per cent. of this sum were available as dividends, the balance for distribution would be £297,000, say £300,000, or equal to a dividend of 12 per cent. on what may be called the accumulated capital of £2,500,000. Would this be acceptable to the haute finance of the Rand? I think that it would not give rise to any enthusiasm at all. It would not admit of much appreciation of share values, even if one were to disregard the question of amortization of capital. This 12 per cent., bear in mind, would have to cover all the additional benefits which are usually obtained by underwriters in view of the risk assumed by them, for it would not be permissible to water the capital to any extent, even if the Government waived its objection to this procedure. The speculative element would be reduced to an inconsiderable quantity, and without this alluring feature the investment would be deprived of its principal attraction in the eyes of the public. It is quite possible that in taking the minimum basis of profit quoted by *The Statist* I am taking an unduly low figure. It is, at any rate, a safe one as far as available evidence goes, and particularly in view of the patchy nature of the Far East Rand bankets. A large mill crushing 1,100,000 tons per annum has got to "hustle," as the phrase goes, and "hustling" on that scale does not permit of selective mining nor of elaborate sorting. There are other difficulties which enlarge the field of risk; for instance, the exigency of labour supply. It is unnecessary to go further, I think. From any reasonable point of view it seems difficult for the Government and the capitalist to reconcile their respective demands, though one is not yet prepared to say that the difficulty is insuperable.—Yours, etc.,

ENGINEER.

The scope of the Mining Institute continues to extend, and the latest expansion is in the Witbank district, where Professor Yates, at the request of the colliery officials, has opened a branch of the Institute. The Town Council has shown its approval and appreciation of the scheme by placing the Witbank School at the service of the Professor for the lectures, and we understand the local managers are giving their hearty support.

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THE NEW COAL-DUST EXPERIMENTS.—II.

Seventh Report of the Explosions in Mines Committee.—Phthisis and Rand Mine Dust.

[By J. S. Haldane, M.D., F.R.S.]

Dangerous and Harmless Dusts.

From coal-mining experience it is evident that the breathing of dust in moderate quantity is not necessarily unhealthy. On the other hand, the mortality statistics and other evidence in connection with metalliferous mining show that the breathing of certain kinds of dust is extremely unhealthy.

Unfortunately, it has not proved possible as yet to specify exactly, either from physical examination or chemical analysis, what kinds of dust are harmless, and what kinds harmful, when breathed. Human experience enables us to say, however, whether or not certain varietes of dust are, as a matter of fact, dangerous or not. It seems quite clear, in the first place, that fine dust from uncombined crystalline silica is dangerous. A typical example is the quartz dust produced in mining the gold-bearing quartz reefs in the Transvaal. Another example is the dust from powdered flint, used in the pottery industry. The dust from granite in Cornish mines, and in the granite-cutting industries, is another example. Granite is a mixture of crystalline quartz with the silicates mica and feldspar; and presumably the ill-effects are mainly due to the quartz. Other examples are the dust from ganister, hard sandstone, millstone grit—all forms of crystalline silica. On the other hand, there are many forms of inorganic or organic dust which are known to be practically harmless. Instances of these are chalk, clay, various silicates or aluminates, such as those of Portland cement, and the dusts from soft limestone, coal, hematite, and other iron ores. In the case of dust from hard materials other than crystalline silica the evidence from human experience is still somewhat doubtful. It is known, for instance, that dust produced in the grinding or polishing of steel causes phthisis; but whether the danger is due to the steel dust as well as to that from the grindstones or emery is somewhat doubtful. The fact that phthisis as well as lead-poisoning is very prevalent among file-cutters, who are exposed to a mixture of dust from metallic lead and steel, would seem to indicate that steel or metallic lead dust is dangerous, since exposure to dust of lead compounds does not by itself seem to predispose to phthisis. The dust from emery (a form of alumina) would also be a somewhat doubtful case but for the results of experiments on animals. Equally puzzling is the case of the dust from various very hard stones containing, perhaps, 70 to 80 per cent, of silica, partly combined as silicates and partly free. Although these stones are very hard, and contain much uncombined silica, it seems that little danger may arise from breathing the dust produced from some of them. Enquiries as to any connection between phthisis and the inhalation of slate dust had also a negative result. Not much light on the reason why some kinds of dust are so dangerous has been obtained as yet from a study of the dust particles found in the lungs after death. Large quantities of fine amorphous-looking dust can be seen with the microscope in the lungs of men who have been exposed to dust, and have died of lung disease; and whether the dust [illegible] been harmless or not, it may remain in the lungs for many years. For instance, in a case recently examined by Mr. Mavrogordato and myself, harmless hematite dust, easily recognised by its red colour, was abundantly present in the lungs of a miner who died of typical fibrotic miners' phthisis, due undoubtedly to work in Transvaal mines, although it was 13 years since he had worked in a hematite mine, and eight years since he left gold-mining for another occupation in which he was never exposed to dust. He had worked in hematite mines after his first period of work in the Transvaal, and this may have had to do with the fact that so much hematite dust remained in his lungs.

The physical and chemical properties of quartz strongly suggest that the production of phthisis as a consequence of inhaling dust is connected with the hardness, sharpness, fineness and insolubility of the dust particles; but in the present state of knowledge this can only be regarded as a probable working hypothesis. The main fact definitely known is that as a consequence of the damage produced by continued inhalation of crystalline siliceous dust of certain kinds the lungs become predisposed to attacks by tubercle bacilli, the effects of which constitute phthisis, and also to bronchitis. It is very generally believed that a fibrotic condition of the lung may be produced by the influence of dust, apart altogether from infection by the tubercle bacillus. Animal experiments have, moreover, proved that intense exposure to dust will produce fibrosis, apart from tubercular infection; but though fibrosis apart from tubercular infection; but though fibrosis (the practical conversion of the lung tissue into fibrosis tissue) is commonly far more prominent in cases of miners' phthisis than in ordinary phthisis, the history of the cases I have seen has seemed to point to tubercular infection as a main cause of the final fibrosis and other serious symptoms. In the case of the former hematite miner referred to above the lungs were typically fibrotic, and were free from cavities or caseous deposits, but the tubercle bacillus had been recognised in the sputum during sanatorium treatment one and a half years before death occurred. In the solidly fibrosed areas visible dust was, moreover, scarce—a fact which seemed to be against the theory that dust alone was the direct cause of the main fibrosis.

Shale Dust.

The variety of inert dust originally proposed by Sir William Garforth for preventing coal-dust explosions was the dust of powdered shale. This dust is naturally present on the roads of most British coal mines, and was present in large amounts on many of the roads at Altofts, the colliery under his control. Most of the experiments on inert dusts at the Eskmeals Station have been made with shale dust. I shall first deal, therefore, with the evidence from actual experience in coal mines, backed by the results of experiments on animals. In proposing the use of shale dust Sir William Garforth was well aware that the presence of dust from shale or "bind" was no new factor in coal-mining. A great proportion of the roads at Altofts Colliery (including those in which inflammation was arrested in the Altofts explosion of 1886) and other collieries are and always have been thickly covered with shale dust. This is especially the case with return roads, which in this district commonly include the travelling roads. When a shift is going in or coming out on one of these travelling roads much shale dust is raised into the air, and the men necessarily inhale a good deal of shale dust. Through the courtesy of Sir William Garforth and Mr. Lloyd (general manager of Altofts Colliery), I was enabled to observe the amount of dust thus raised. No ill-effects attributable to the shale dust had ever been experienced so far as local enquiry could decide the question, and I myself personally interviewed a number of the older men who had been accustomed over long periods to travel in and out along return roads thick with shale dust. They were not only perfectly well and sound in health, but were unanimous in considering that the shale dust did no harm to them or to other men. In most collieries the men travel in and out on intake roads which are naturally covered, not with light-coloured stone dust, but with black dust, which would naturally be classed as coal dust. The men, of course, breathe a great deal of this dust when it is disturbed by the shift going in or coming out. A great deal of black dust must also be inhaled during work at the face or in haulage operations. Now this dust is, fortunately for safety from explosions, seldom pure coal dust, but a mixture of coal dust with dust from the shales, clays, "binds" or "clunches," which usually constitute the floor, roof and sides. This material readily disintegrates with the work and traffic, the dust so formed mixing with the coal dust. Unfortunately, our information is as yet very imperfect as to the proportion of stone dust usually present along the roads of collieries in different districts and working different seams, but it seems clear enough that there is nearly always a good deal of shale dust present but for which colliery explosions would be, to judge from the experiments at Altofts and Eskmeals, much more frequent and far more violent. Samples of fine "coal dust" from intake roads or from the face, collected by myself and others in different collieries and analysed at the Doncaster Coal-owners' Research Laboratory, have commonly contained from 15 to 60 per cent. of stone dust. It is this mixture which is mainly breathed by the men, and the fact that colliers are, as a class, so immune from phthisis is in itself good evidence that dust from the shales, etc., which are commonly adjacent to coal seams is relatively harmless. It is possible, however, to bring forward still more definite evidence, thanks to an investigation recently conducted under the direction of the late Mr. J. W. Fryar, who was until his regretted decease, general manager of Messrs. Barber, Walker and Company's Collieries, and a member of the Doncaster Coal-owners' Research Committee. The Nottingham colliery district, although a very old one, has hitherto been free from colliery explosions. In order to judge as to the cause of this immunity, and as to how much stone-dusting is nevertheless desirable in collieries of this district, he arranged for a systematic sampling of the dust along haulage roads which had not been stone-dusted in a number of collieries. The samples were all collected by Mr. C. F. Hoyle, who was thoroughly experienced owing to practice which he had previously had at Bentley Colliery in connection with the work of the Doncaster Coalowners' Research Committee, and the analyses were carried out at their laboratory by Messrs. Winmill and Graham. The full results were kindly placed at my disposal by Mr. Fryar, who also arranged with the managements for my visiting several of the collieries which were investigated. The samples were taken from 19 collieries in the Nottingham district, about 170 samples being collected from workings in eight seams. In each case samples were separately taken from the floor, sides, and roof at positions, (1) about 200 yards in-bye on the pit-bottom; (2) about half-way to the working face; and (3) about 200 yards out-bye of the face. To obtain a measure of the fineness of the dust the samples were first passed through a sieve of 10 meshes to the inch in order to separate the coarse lumps. Of what passed through, the percentage which passed a 90-mesh sieve was then determined, and the analysis performed on this finer portion. The mean results are given in Table II.

Table II.—*Averages for Samples taken on Haulage Roads in Collieries of Nottingham District.*

Place at which samples taken.	Percentage of ash.			Fineness, as percentage passing through a 90-mesh sieve, what passes through a 10-mesh sieve being 100 per cent.		
	Roof.	Sides.	Floor.	Roof.	Sides.	Floor.
200 yards in-bye of pit-bottom	41.2	36.1	33.6	73.6	69.9	38.8
Half-way to face...	38.1	42.1	37.7	84.2	67.3	35.3
200 yards from face...	50.7	56.2	51.0	83.2	55.3	37.3
Mean	43.3	44.8	40.8	80.3	64.2	37.1

There was an average of 43·0 per cent. of ash in the fine dust. This ash practically represents shale dust, so that nearly half the dust breathed by men passing along the roads in this colliery district will be shale dust. The proportion is certainly higher than in most other districts, and the high proportion (particularly in roads near the face) seems to explain the relative immunity of the district from explosions, since dust of this composition is very difficult to inaflme. As might be expected, the dust from the roof timbers is much finer than that from the floor, but its ash content is practically the same, showing that shale dust passes into the air ar readily as coal dust, and along with it.

(*To be continued.*)

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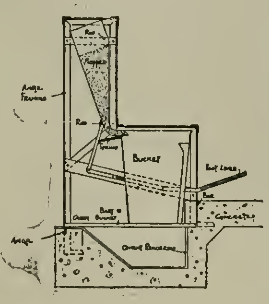

SECTION showing Hopper and Gearing in position of rest, or immediately after foot lever has been released.

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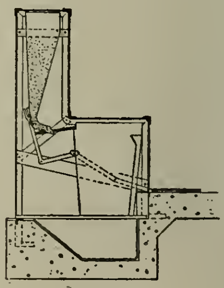

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ELECTROLYTIC PRECIPITATION OF GOLD, SILVER, AND COPPER FROM CYANIDE SOLUTIONS.*—II.

[By G. H. Clevenger.]

The precipitation-boxes were divided by wooden partitions in alternate wide and narrow compartments, twelve of each. The partitions were so arranged as regards the bottom that the narrow compartments throughout the box served only for the down-flow of the solution, while the wide compartments, in which were suspended the anodes and cathodes, served for the upward flow of solution. Each wide compartment was fitted with 18 lead anodes whose surface was coated with lead peroxide, formed by electrolysis in a special cell, and 17 cathodes composed of lead foil, cut in strips, strung upon wires supported by wooden frames similar to the cathodes used with the Siemens-Halske process. The current was supplied by two dynamos, each capable of developing 250 amperes at 30 volts, feeding into copper bus-bars 1¼ by ¼ inches laid on top of the boxes. In order to insure good contacts, the wires leading from the individual anodes and cathodes were soldered to the bus-bars, mercury-cup contacts having proved unsatisfactory. The solution passed through three sets of boxes, each set comprising two boxes set in tandem. One set of two boxes was used for precipitating the solution resulting from sand treatment and two sets of four boxes for precipitating the solution resulting from slime treatment. The current density was so regulated that the metals were deposited as a flocculent precipitate which fell to the bottom of the compartments in the form of a fine slime, as in zinc-shaving precipitation, rather than as an adherent coating upon the cathodes as in the Siemens-Halske process. After a short period of operation, it was found that the precipitate did not all fall to the bottom of the box, but that part of it formed a loosely-adherent mass on the cathodes. This necessitated washing and shaking of the cathodes when it was desired to make a complete clean-up. It was soon apparent that the fragile lead-foil cathodes could not long withstand such treatment. Investigation resulted in abandoning the lead-foil cathode in favour of a cathode made from ordinary tin-plate, which possessed the necessary strength and from which the precipitate could be readily brushed without removal of the cathodes from the containing box. The pan-amalgamation tailing cyanided at this plant resulted from the treatment by raw pan-amalgamation of a comparatively simple silicious silver-gold ore. After the tailing deposit had been exhausted, the low-grade ore from the mine was treated. The sand was treated by percolation and the slime by agitation, natural settlement and decantation. The volume of the solution precipitated varied, as did also its metal content. The proportions of cyanide and alkali were less variable, but by no means constant. Below are given average figures covering two months' operation, for solutions resulting from sand treatment when pan-amalgamation tailing was being treated. Average amount of solution precipitated per 24 hours, 216 tons. Current density 0.55 amperes per square foot of anode surface. The voltage across the anodes and cathodes varied in the different compartments, but averaged about 3. The head solution, or solution entering the precipitation boxes, contained: 0·147oz. gold per ton; 3·51oz. silver, and 0·0792 per cent. cyanide in terms of potassium cyanide. The tail solution or solution leaving the electrolytic precipitation boxes contained 0·013oz. gold per ton, 0·29oz. silver, and 0·0938 per cent. cyanide. The grain in cyanide was 0·0146 per cent. As 1·2 tons of solution was used in treating each ton of sand, the cyanide apparently regenerated amounted to 0·35lb. per ton of sand. The percentage of gold precipitated was 91 and the percentage of silver precipitated was 91·7. No attempt was made to lower the gold and silver in the tail solution, as none of it was used for final washes. The following are average figures covering the same two-month period for the precipitation of solution resulting from slime treatment: Average amount of solution precipitated per 24 hours, 480 tons. Current density 0·3 ampere per square foot of anode surface. The voltage across the anodes and cathodes averaged 2·6. The head solution contained: 0·055oz. gold per ton, 1·45oz. silver, and 0·0409 per cent. cyanide. The tail solution contained: 0·0067oz. gold, 0·15 oz. silver, and 0·0527 per cent. cyanide. The gain in cyanide was 0·0118 per cent. As 4 tons of solution was used for each ton of slime the cyanide apparently regenerated amounted to 0·94lb. per ton of slime. The percentage of gold precipitated was 88 and the percentage of silver 89·6. When the solution flow was cut down to two-thirds normal, the tailing contained 0·0025oz. gold and 0·06oz. silver per ton. The regeneration of cyanide was doubtless greater with the solution resulting from the treatment of the slime on account of the greater proportion of copper contained. When treating ore directly from the mine containing little or no copper, the regeneration was not sufficient to be detected by ordinary titrations.

San Sebastian.

The original electrolytic precipitation plant installed at Butters' Salvador Mines, at San Sebastian, Salvador, was similar to the Minas Prietas plant. However, it was found necessary to modify the practice in several particulars. The two wooden containing boxes were 30ft. long, 10ft. wide, and 4ft. 8in. deep. The bottom was given a slope to one side at the rate of one inch per foot. Each box was divided into 12 compartments, 10 of which were used for precipitation, the last two merely serving as settlers. Each compartment contained 25 anodes and 24 cathodes. The anodes were rolled lead plates ⅛in. thick, 22in. wide, and 48in. long. For some time the anodes were peroxidized in a special cell using an electrolyte consisting of 1 per cent. of potassium permanganate and 2 per cent. sulphuric acid; but later untreated lead plates were used. At first tin-plate cathodes similar to those used at Minas Prietas were tried, but difficulties arose that made it necessary to abandon the tin-plate cathode. The original intention was to deposit gold and copper as a non-adherent slime, as at Minas Prietas, but despite the fact that a higher current density was used the gold and copper were deposited upon the cathodes as a firmly adhering coating. The predominating metal in the solution at Minas Prietas was silver, but at San Sebastian it was copper. The well-known fact that silver is prone to give non-adherent coatings, while copper has a strong tendency to give adherent coatings, seems to offer a ready explanation of the difference in behaviour of the precipitated metals at the two plants. The removal of the strongly-adherent copper-gold plating from the tin cathodes presented a most difficult problem. Various expedients for removing it were tried, such as heating the cathodes with a gasoline torch, scraping and pounding them, etc. After these various heroic measures had proved ineffective, it was decided to return to the lead-foil cathode cut into strips, as used in the Siemens-Halske process. When it was desired to clean-up, the lead-foil strips were removed, ground, and shipped for smelters for the separation of the metals. The current was supplied by a belt-driven dynamo giving 450 amperes at 30 to 35 volts. The current density was 10 amperes per square foot of anode surface, and the voltage across the anodes and cathodes in each compartment was 4 to 4½. This general practice was continued until C. P. Richmond modified it so that the metals could be separated locally† The lead-foil cathodes were replaced by sheet-lead cathodes 1-16in. thick, 22in. wide, and 48in. long, so arranged that they could be readily removed from the containing-box. To this end, the connecting wires for the cathodes, instead of being soldered to the copper busbars, were clamped by wing-nuts in split studs screwed into the bus-bars. The wires from five anodes and cathodes of opposite compartments were laid in each slot and a tight connection secured by screwing down the wing-nut. The studs were spaced 19 inches apart, and six of them connected the cathodes of one compartment to the anodes of the adjoining compartment. By this arrangement it was possible to remove any of the cathodes without interrupting the flow of current or solution. At San Sebastian it was found advantageous to operate so as to keep the concentration of the copper down to a point where it did not interfere with gold extraction, and precipitate the remaining gold by zinc shaving. This was done despite the fact that zinc was said to interfere with electrolytic precipitation in South Africa. The solution leaving the electrolytic-boxes was divided between two zinc-boxes each 22ft. long and having compartments, 2ft. by 1ft. and 2ft. deep, filled with zinc-shaving. The material was a high-grade gold ore containing considerable pyrite and sufficient copper left in the soluble form after the roast preceding cyanide treatment, to occasion trouble in cyanidation unless electrolytic precipitation were used. The average gold-content varied, but at the time that electrolytic precipitation was in use it ranged from 2oz. to 4oz. per ton. The soluble copper varied from ½lb. to 2½lb. per ton. The ratio of gold to copper in the electrolytic deposit ranged from 1:7 up to as high as 1:25; but generally was between the limits of 1:9 and 1:14. The average results of two months, taken at random, will give a general idea of the performance. During this period there was treated 45 tons of ore daily, averaging 2·27oz. gold per ton. Approximately 150 tons of solution was precipitated daily. The average content of the head solution was: Gold 0·79oz. per ton; copper, 0·075 per cent.; cyanide, 0·118 per cent. The average content of the tail solution from the foot of the zinc-box was gold 0·004oz. per ton, copper 0·048 per cent., cyanide 0·154 per cent. The percentage of gold in the deposit at the head of the electrolytic-box was about 7; at the foot of the box it was about 3. The current density was 1 ampere per square foot of cathode surface. The voltage across the anodes and cathodes of each compartment was 4 to 4½. During the treatment of the ore there was consumed 7·2lb. of sodium cyanide per ton. There was precipitated in the electrolytic-boxes 1·5lb. of copper and apparently there was regenerated 1·92lb. of cyanide, in terms of potassium cyanide, per ton of ore treated. Eighty to 90 per cent. of the gold and most of the copper was precipitated in the electrolytic-boxes. Passage through the zinc-boxes brought the total percentage of gold precipitated up to 99·5. The zinc-boxes precipitated little copper despite the fact that the solution invariably contained copper at this point. Under normal conditions the percentage of copper in solution remained nearly constant, any increase through contact with the ore being precipitated by the electrolytic-boxes. When the copper accumulated in the solution, as was sometimes the case through treating ore containing an unusually high proportion of copper, the bad effect was at once noted upon the gold extraction.

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* Abstract of paper presented at the twenty-eighth general meeting of the American Electrochemical Society in San Francisco, September 16-18, 1915.

†For details of the electrolytic separation of the copper-gold deposit, see "The Electrolytic Precipitation of Gold, Silver and Copper from Cyanide Solutions," by G. H. Clevenger, Vol. xxviii., Trans. Amer Electro-Chem. Soc.

(To be continued.)

PERSONAL.

Mr. J. C. K. Pollock, formerly secretary to Randfontein Estates, has been appointed to the directorate of that company.

* * * *

Mr. Edgar Pam, General Manager of the Geldenhuis Deep, and President of the Mine Managers' Association, left this week for England to join the Royal Engineers for active service.

* * * *

Mr. Bourchier Hawkesley, whose death was announced last week, was a member of the firm of Coward & Hawkesley, Sons & Chance, London, solicitors to De Beers Company, as well as solicitors to the Chartered Company. He was a close personal friend of Mr. Cecil Rhodes, and was his confidant in most of the Imperial statesman's great schemes. That he was a wise and sagacious counsellor there can be no doubt, and his judgment was always regarded as of inestimable value by his friend. His loss will be particularly felt in Rhodesia, where so many important questions still await settlement. One of his most recent visits to this country was during the discussions between the Chartered Company and the Rhodesians regarding the provision of their new land policy, and at that time, while his professional zeal for the company was recognised, it was felt that as one of Mr. Rhodes' nearest friends he would strive to make the constituents of the creator of Rhodesia happy and contented.

MINING INSTITUTE.
TEACHING CENTRES: JOHANNESBURG AND WITBANK.

Prof. YATES prepares candidates for the following Government Certificates:—
MINE MANAGER'S. MECHANICAL ENGINEER'S.
MINE OVERSEER'S. ELECTRICAL ENGINEER'S.
MINE SURVEYOR'S
by Class, Private Tuition and Correspondence.

The aggregate percentage passes for the combined classes is nearly 80 %
OVER 200 SUCCESSES.
St. James' Mansions, Eloff St.

The twentieth annual general meeting of members of the Geological Society of South Africa will be held in the Council Chamber, Chamber of Mines, Johannesburg, on Monday, 31st January, 1916, at 8.30 p.m. Business: (1) To receive and consider the annual report and statement of accounts for the year ending 31st December, 1915. (2) To elect twelve members of Council in place of Messrs. A. von Dessauer, A. L. du Toit, A. L. Hall, H. S. Harger, G. G. Holmes, J. G. Lawn, H. B. Maufe, E. T. Mellor, P. Range, A. W. Rogers, D. Wilkinson, and R. B. Young, who retire under the rules of the Society. (3) To elect a president, vice-presidents, and honorary secretary for the ensuing year. (4) To elect an auditor for the ensuing year. Dr. A. W. Rogers will deliver his presidential address.

A United States Bureau of Mines technical paper says explosions can no longer be considered "acts of God" for which no one is responsible. The mines of Belgium are noted as the best illustration of the advantages of carefulness. In those mines great instantaneous outbursts of inflammable gas from the measures into the mine workings are frequent, sometimes smothering the men, yet for the past twenty years no explosions of any magnitude have occurred through ignition of the gas, though prior to 1893 when less precautions were taken, there had been many great disasters. It is stated that without open flame of some sort there would be no explosions, and British statistics are referred to demonstrating that about 90 per cent. of the explosions or inflammations occurred in open light, or so-called "non-gaseous" mines. It may be interesting to recall that Scotland is regarded as a non-gaseous district. Last year in this country there were four fatal accidents and seven deaths, all due to naked lights. There were 39 non-fatal accidents injuring 53 persons, and of these 38 with 51 injuries are attributed to the open light. The Mines Inspector, in his report, says: "The four fatal accidents were all due . . . . to preventable causes, and, if the discipline had been satisfactory, and both officials and workmen been doing everything in their power to prevent accidents they would not have been recorded."

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

Rhodesian Section.

LATEST RHODESIAN MINING NEWS.

Rose of Sharon.— Rhodesian Native Mine Labour. Rhodesian Chamber of Mines Report.— Cam and Motor Position—Charterland and General Exploration—

The report of the Rose of Sharon and Shamrock Gold Mines (1911), Limited, for the year ended September 30th states that up to October last the reports from the tributors, both as regards development and output, were considered satisfactory, but on the 23rd of that month information reached the Board that the tributors, owing apparently to financial reasons, were unfortunately compelled to cease operations and give notice to terminate their contract.

* * * *

The following circular has been issued by the Rhodesian Native Labour Bureau to its members:—Members will recollect that the policy of the Board of Management, as indicated at the annual meeting held last June, is to reduce the capitation fee, provided sufficient support is accorded to the Rhodesian Native Labour Bureau. The Board have to report that during 1915 there was a fair response to their appeal—not as great as was desirable, but sufficient to warrant a further reduction in the capitation charge. Therefore, they have pleasure in announcing that the fee will be reduced from £3 to £2 15s. per capita, in respect of natives engaged on twelve months' agreement, and distributed to employers on and after January 1st, 1916. This, together with the previous reduction, represents a total decrease in the capitation charge of 15s. per native since May, 1915. The Board take this opportunity of again emphasising the fact that their efforts to improve the efficiency of the Bureau's organisation and to further lower the capitation fee depend entirely for success upon the strong and consistent support of the employers of labour in Southern Rhodesia. The Board feel confident, however, that the substantial reductions already effected will be appreciated by members, and again ask for that additional support which is vitally necessary for the successful completion of their programme.

* * * *

The Cam and Motor returns for the year were as follows: Tons treated, 142,702; yield, 51,129 ozs.; value, £222,067; or 30s. 4d. per ton; costs, £176,980, or 24s. 9d. per ton; profit, £45,086, or 5s. 7d. per ton. Although conditions in several particulars were adverse and the mine is not yet into its stride, the Cam and Motor's results in the past year—for which the report and accounts are published in this issue—run into big and business-like figures, with a working profit of £45,086, a net profit of £15,512, a tonnage treated of 142,702 tons, giving a yield valued at £222,067, ore reserves at the Motor mine of 739,844, and costs down from 26s. 3d. to 24s. 9d. At the Cam—Good Shepherd mine and the Petrol mine the reserves are 123,000 tons of a value of £273,000. The feature of the year is, of course, the improved extraction. Mr. J. McDermott, the general manager, concludes his report with the following observations:—" It was fully expected that the erection of the decantation plant for the treatment of current slime would have been completed early in the present year, but, owing to exceptionally heavy rains during its erection, together with the late delivery of certain sections of the plant caused through hostilities in Europe, it was not brought into operation until May. This delay was most disappointing, as, in addition to the time lost in increasing the revenue from the mine, considerable extra expense has been added to erection costs. It is, however, very gratifying to record that on the whole the additional plant installed has run most successfully, and there is no doubt that, when it is brought up to its full capacity considerable economies will be effected in treatment costs. The working costs are high, due to the tonnage treated being considerably below the estimate for which the plant was laid out and to the large amount charged for development redemption, equivalent during the year to 2s. 3d. per ton treated. Whilst the results of the year's operations show a pleasing advance on the previous period, they are still not representative of the capabilities of the plant. The prospects for the coming year are good, and the only requirement for considerably improved profits is a sufficient supply of white labour. The development work so far carried out during the year below No. 6 level has proved the ore body to be continuing down strongly and carrying highly payable values over a great width. In summing up the result of the first two months' run with the reorganised plant, it must be considered, from an extraction point of view, highly satisfactory."

* * * *

The report of the Charterland and General Exploration and Finance Company, Ltd., for the year ended 31st August states that the returns of the Old Nic and neighbouring claims show:—Tons crushed, 29,831; treated by cyanide, 16,538; bullion, 11,049·3 ozs.; realised, £41,009; working costs, £36,545; cast per ton, £1 4s. 6·02d. The working costs, £36,545; cost per ton, £1 4s. 6·02d. The working of 7s. 6d. per ton of ore crushed up to and including July and 7s. per ton for August, but exclusive of depreciation of buildings, machinery, plant, etc. The report of the consulting engineer shows that a reduction of 6s. per ton in working costs, as compared with the previous year, has made it possible to mine a lower grade of ore at a profit, and also that £11,124 has been written off for development redemption out of the total of £12,327 standing in last year's balance sheet at the debit of development account. It has not been possible to effect any sales of land or stands during the period under review. After providing as usual for depreciation on buildings, plant, etc., in Rhodesia, and writing off redemption in respect of the development of the Old Nic mine, the balance of profit carried down, representing the result of the normal trading for the year, amounted to £7,099. In view of the anticipated near exhaustion of the Old Nic mine, the consulting engineer recommends further considerable depreciation of the plant and machinery. This the Board has decided to meet, writing off £5,327 in the present accounts. The Board has also considered it advisable to write off depreciation to the extent of £17,283 on the company's holding in debentures, shares and interests in other companies, so as to bring their value more into conformity with the prices now ruling, and they stand in the balance sheet at £82,679. At 31st August, 1915, the value was £76,503, showing a depreciation of £6,176, but taking into consideration an appreciation on some of the holdings of £404, the net depreciation was £5,772. At current prices such net depreciation has recovered to the extent of about £3,500. By making these provisions the balance standing to the credit of the profit and loss account is reduced to £193.

* * * *

The report of the executive committee of the Rhodesian Chamber of Mines for the month of November, 1915, states: Native Labour.—The following is a summary of the returns of native labourers employed on Southern Rhodesian Mines during the months of September and October: Local, September, 12,974; October, 12,356; Portuguese territory, September, 7,764; October, 7,705; Northern Rhodesia, September, 10,140; October, 9,495; Nyasaland, September, 7,947; October, 8,624; other sources, September, 1,025; October, 1,215; total, September, 39,850; October, 39,395. The number employed in October shows an increase of 4,042 as compared with the corresponding month of 1914. Special Protection during War.—Your committee have been advised by the Secretary for Mines that in cases of individual claimholders who have left the country on war service, the claims are held over from forfeiture during absence at the Front, Inspections which may become due in the meantime will have to be taken out on their return, but time will be allowed for this, the period mentioned being four months. In the case of other claimholders who are at the present time unable either to dispose of their claims or obtain the funds required to take out the inspections by work temporary protection is generally being granted for periods of four months on payment of five shillings per block per month. In every case the footage is only temporarily excused and is, therefore, accumulating. Your committee consider this most unsatisfactory, and hold the view that if a good case for temporary exemption from the obligation to carry out the footage is made out no liability for the amount thus excused should accrue at the end of the war, or on the return of the claimholder from active service, and have represented their views accordingly to the Government. Faction Fights.—The attention of the Attorney-General has been drawn to a ruling given by the Magistrate at Wankie to the effect that Compound "Police" have no authority to order combatants to desist from fighting, and your committee have requested the Attorney-General to consider bringing the ruling under the review of the High Court. Brewing of Kaffir Beer.—The Administration has drawn the attention of the Chamber to the irregularities which exist on many mines as regards the brewing and issue of beer. Your committee have circularised mines on the subject. Gold Trade Ordinance.—The sub-committee which has been sitting on the amendment of the Gold Trade Ordinance has now concluded its labours, and the report has been adopted by your committee. As soon as agreement is reached with the other mining bodies on the details of the report it is proposed that joint representations shall be made to the Government with a view to the introduction of amending legislation at the next Session of the Legislative Council.

Luipaardsvlei Estate.

During the month of December, 1915, this company crushed 20,520 tons, the total profit won being £3,860 9s. 2d.

Southern Van Ryn Reef.

The secretary of the Southern Van Ryn Reef Gold Mining Company, Ltd., has issued the following statement regarding the assay results of the reef recently struck in No. 3 borehole put down by the company on Mairevale, about three miles south of Daggafontein:—

"The full width of the core carrying reef matter is 50½ inches. Of this 21 consecutive inches give an average of 5 dwt. Included in the 50½ inches are 20½ inches of quartzites with pyritic bands and occasional pebbles. The assays of these are low. The footwall portion of the reef of 5 inches in thickness assays 2.7 dwt. The Board has decided to have the other portions of this section of the reef also assayed. Four inches of the shale footwall were assayed and gave 2.3 dwt. The footwall is identical with that at the Nigel and the bottom reef at Daggafontein, and the banket has also the same characteristics. These features leave no room for doubt that this is the Nigel reef which Dr. Mellor correlates with the Main Reef of the Central Rand, and is an entirely different reef from that struck in the No. 1 borehole at a depth of 617 feet. The reef found in the No. 1 borehole proved to be identical in every geological feature with the Van Ryn reef as exposed in the mines of the far East Rand, and the No. 3 borehole was located to cut the sub-outcrop of this reef at a shallow depth. When the hole had been put down to 228 feet, at which depth the Nigel Battery Reef was passed through, it became evident that the borehole was located too far to the east to get the Van Ryn reef sub-outcrop, but it was decided to continue the hole to see what values might be found in the Nigel reef. The above is the result. The sub-outcrop of the Van Ryn reef having thus been proved to lie to the westward, another borehole has now been started to cut this reef as near the sub-outcrop as possible. It is expected to be encountered at a very shallow depth, as its course is now more or less definitely known."

Consolidated Gold Fields Group.

The following are the particulars in regard to the outputs and profits for the month of December, 1915, of the undermentioned companies of the Consolidated Gold Fields group:—

Company.	No. of Stamps.	Tube Mills.	Tons Crushed.	Gold declared. Fine Ozs.	Total Profit.
Simmer and Jack ...	320	7	66,800	17,589	£26,483
Robinson Deep ...	150	10	54,300	18,427	26,004
Knights Deep	400	11	103,900	19,477	16,509
Simmer Deep	220	10	65,300	12,771	5,091
Jupiter	80	5	19,600	5,560	4,188
Sub Nigel	30	2	7,750	3,579	4,003
Totals	1200	45	317,650	77,403	£82,278

The sundry revenue included in the above total declared profit is as under:—Simmer and Jack, £1,500; Robinson Deep, £43; Knights Deep, £52; Simmer Deep, £2,196 Jupiter, £954; Sub Nigel, £221; total, £4,966.

Reserve Gold:—Simmer and Jack, 5,080 ozs.; Robinson Deep, 3,017 ozs.; Knights Deep, 3,256 ozs.; Simmer Deep 525 ozs.; Jupiter, 635 ozs.; Sub Nigel, 1,575 ozs.; total 14,088 ozs.

Nigel G.M. Co., Ltd'

The returns from the Nigel Gold Mining Co., Ltd., for the month of December are as follows: Tons milled, 11,500; gold, 3,165 fine ozs.; loss, £198.

The Uses of Simple Language.

Before a large and representative audience of the nation's mine owners and operators, Dr. George Otis Smith talked on "Plain Writing" at the recent convention of the American Mining Congress. Among other things in his plea for the use of popular language for the expression of scientific thought, Dr. Smith said: "It is our ambition that the reports of the United States Geological Survey shall be written in the language of the people. At its best science is simple. Scientific thought must be accurate and to the point. The reader often finds himself facing a 'no admittance' sign when he opens a scientific report. How common is the sad discovery that a piece of obscure writing is simply the product of roundabout reasoning and twisted thinking. Printer's ink is not a re-agent for clarifying muddy thoughts. Plain thinking must come before plain writing. There's the rub. The exploration, surveys and investigations of the Geological Survey are in the public interest only as results are made public."

Messina Copper.

Generally speaking, Mr. H. C. Hoover, who occupied the chair at the recent meeting of the Messina—reported fully in another part of this issue—in the absence of Mr. Leslie (the chairman of the company), had a remarkable state of affairs to lay before the shareholders. At June 30, 1914, the current liabilities exceeded liquid assets by about £75,000. At June 30 last the liquid assets exceeded the current liabilities by about £31,000, this being due to the manner in which the balance sheet had been cleared. Further, the company had overdrawn at its bankers at the end of 1914 by about £85,000; at the date of the balance sheet the loan had been reduced to £27,000. This has since been paid off, and there is a credit balance of about £49,000. Shareholders are certainly indebted to the management for such a remarkable improvement in the position. Mr. Hoover pointed out that in order to take advantage of the present high price of copper, the mine output was being pressed, and that in the future results might not be quite so satisfactory. Besides what they have accomplished in a financial direction, the present board has done excellently in the in the matter of technical improvements. The sorting and milling capacity of the plant has been increased from 20 to 25 per cent.; extraction is on the way towards 90 per cent., as compared with 74 per cent. in December last, while it must be remembered that the increased extraction is obtained from a lower grade of ore. The Messina Company now controls the whole of its unissued shares.

WRIGHT'S ROPES.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Hopes on Account of Far Eastern Rand—Americans and Australians After Rand Properties—Brick Ground Enquired For—Johannesburg Travellers Visiting Coast Towns.

This being the second week after the holidays, business on the Commercial Exchange has become normal for the war period. In the interchange of ideas, a feeling of hesitancy is uppermost, as stocks in the merchants' hands are not so large as at this time last year, therefore in tendering for goods to arrive, the question has to be seriously considered, as to whether the goods can be obtained pretty much as usual from the makers, and when so obtained, whether the shipping facilities will be reasonably available. Notwithstanding there is very little doing, hopes are running high as to the orders eventually expected from the Far Eastern Rand, when once the go-ahead developments get started in earnest. In this connection, a representative of a mining group was interviewed, and it was discovered that plans had been prepared for the various initial works contemplated; however, the men in authority and responsible for a successful start will not hear of anything savouring of immediate action as regards securing machinery and the necessary mining material. They argue that it would be unwise, to say the least, to go into the open market with the view of obtaining mining plant to any extent, as it might disorganise the market, and the risk would be run of interfering with the present producing mines, and another point is that it is not desirable to further inflate an already high and restricted market.

Americans and Australians After Rand Ground.

So much has been blazoned forth as to the great probabilities of the Far Eastern Rand, that it is not surprising to find that enquiries from America have become more persistent as to securing mining ground. These enquiries are likely to fructify, as it is on the cards that a representative Rand mining man is arranging to make a journey to New York with the view of placing a block of claims situated in the Springs district. Another enquiry came from a responsible company in Western Australia, whose mining area is soon likely to be worked out. In this instance, the negotiations went a considerable way, but when it came to the price and conditions, which the Australians thought extravagantly high, the once promising deal had reluctantly to be pigeonholed. The share market cables from London continue, day after day, to boom the Far Eastern Rand, which must of necessity eventually spell good business, at first in the Commercial Exchange and afterwards throughout the gamut of trade. Another fact is that recently a prospecting party re-discovered a lost reef, and when the information was verified there was no real difficulty in obtaining sufficient capital to again take the property in hand, for its re-opening and development.

Iron, Steel and Hardware Goods.

It is difficult to find any alteration in values, as the holiday period is not sufficiently over to give time for new price lists to be issued, also the cable information from Britain is very meagre indeed. However, the tendency throughout the iron and steel trades is undoubtedly towards a higher level of prices. The several South African iron and steel works are certainly filling up a gap, a proof of which is that they have more orders to complete than ever before, and although they have raised prices somewhat, yet, so far, not sufficient to say that advantage has been taken of the war conditions. The foundries are also busy, being hampered considerably owing to so many expert workmen having volunteered for the military, and somehow or another the best usually want to go first. The galvanised iron trade is an uncertain quantity as many holders are anxious not to lose a market, but they are inclined to stand out for better prices, as the fairly heavy consignments to hand in the last quarter of last year have been pretty well absorbed, and it is recognised that new purchases in Britain will mean extra costs, when landed here. Hardware machinery spares as well as small battery spares are scarce, and at time a local foundry has to be requisitioned to make parts not available in the ready-mades. Hence people at a distance must make allowances to meet present day contingencies.

Timber, Bricks, Cement, etc.

As regards timber, a vague feeling predominates the present aspect and the immediate outlook, as the mines continue to freely purchase bulk timber, as well as deals in a lesser degree. Holders of stocks refuse to commit themselves far ahead, owing to the uncertainty of shipping which seems to be one of the principal controlling factors in the position. Bricks are in slightly better demand, and some people consider the future of building sufficiently rosy to enquire about ground suitable for brickmaking. The cement trade is still in an unsatisfactory condition as the "catch up" of the factories during the holidays did not come off, chiefly owing to extra demand for cement to make concrete floors, to comply with the Municipal regulations in butchers, dairies, fish shops, etc. Some smart quick work was accomplished during the holidays, and the South African cement came up to all the exacting requirements, but as much as 10s. 6d. per bag, and even 11s. had to be paid to secure sufficient to complete jobs in the contract time. One can always get cement in small quantities in Johannesburg, by taking a little trouble, as consignments reach here daily, as the various factories supply orders in rotation, therefore some one merchant or another must have cement in stock.

Oils, Colours, White Lead, etc.

White lead has advanced three times since Christmas, and now Cookson's white lead at their British factory is £42½ per ton, according to this week's cable advices. It is expected that starting on Monday next the 17th instant the best standard brands of white lead will be 60s. per 100 lbs. in Johannesburg. On the Commercial Exchange, in tendering for mining contracts, it may be 2s. 6d. less, but even that is a very high price indeed. The tendency is upwards for linseed oils, but turps seem steady at the higher level of values. Business in the house furbishing and jobbing is much quieter than in the middle of December last, but hopes are entertained that something like activity may be resumed in another month's time. To illustrate in a small degree the importance of the ramifications of Johannesburg trade, a traveller of one of our large houses in the oil and colour business, was interviewed, when he stated that he was off next week, on one of his usual journeys to the coast towns. It appears that his firm does not altogether profess to supply goods from Johannesburg, but rather direct from oversea to the small men, but since the war great quantities have been sent from Johannesburg direct and in case of part lots the remainder is supplied out of shipments as they arrive from oversea.

Chemicals and Electrical Goods.

There is very little business in the chemical trade, as people are waiting a lead from the mines, who seem to be resting on their oars, until their present big stocks are depleted. So much is this the case that many lines can be purchased cheaper here than at the place of manufacture. Electrical goods are coming in very slowly both from Britain and America, but so far no real inconvenience has been felt as very few contracts have been given out this year.

Revised Price List.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d., 19s. 6d. and 22s. 6d. (local do., 14s. 6d. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 2¾d. lb.; drill, 4¾d. lb.; tool, 7d. per lb.; steel plates, 10 ft. x 4 ft. x 1-16 in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 42s. 6d.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 35s.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, ¾ in. and under, 25s., and above that size, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £14½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8½d., 11 ft. 9d., 12 ft. 9½d.; 26 gauge, 6 ft. to 10 ft., all lengths about 8d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 31s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9 x 3, up to 16 ft., 9½d.; over, 9¾d. to 10¾d. (Oregon, 10⅛d.); flooring, 4½ x ⅞ and 6 x ⅞, 4½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4½d.; pitch pine, 5s. 7d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 25s., boiled, 25s. per 5 galls.; white lead, 56s. to 58s. per 100 lbs.; turps., 50s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 3s. 6d. per 12½ lb. bladders, 23s. 6d. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 4s. 6d. lb.; alum, 4d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay) 50s., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yard; 3/20 coils of wire, 25s.; do., 3/22. 21s.; tubing, 12s. to 13s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 15s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

New Lisbon-Berlyn, Ltd.

The New Lisbon-Berlyn is another victim of the war. The directors' report for the period of eighteen months to September 30 that further consideration has been given to the desirability of reorganising the company's finances and of providing fresh working capital for the purpose of installing the new plant required for the treatment of the pyritic ore. It became apparent, however, that under existing financial conditions, and in view of the likely attitude of the Treasury authorities, no progress could be made. It was with much regret that the directors were forced to this conclusion, as, in the opinion of the company's technical advisers, satisfactory results may be expected from the treatment of the pyritic ore. Instructions were given to stop all work at the mines and to reduce expenditure to the lowest possible point, which has been done. The directors have decided not to draw any fees subsequent to March 31, 1914. The funds required for the protection of the company's property and for general expenditure, have been advanced by the H.E. Proprietary (New), Ltd., to whom this company, at the date of the balance sheet was indebted for £43,155.

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1915.

BY S. R. POTTER.

Vol. I.

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THE WEEK IN THE SHAREMARKET.

Fluctuating at Higher Levels—City Deeps Prominent—Daggafonteins Active—Far East Rand Still in Favour.

The week has seen a further large volume of genuine investment business done, with its inevitable concomitant of speculation. All the popular Far East Rand counters remain in high favour and have been joined during the week by City Deeps, which have begun to come into their own. The mine is doing remarkably well, now that labour is more abundant, and its prospects were never better. The globular figures of the 1915 output of the Rand have incited London leader-writers to eloquence, and the industry is getting the advertisement of its life. Coupled with this, there is the fact that people on this side, well fitted to judge, are buying in good Rand shares for investment purposes in increasing quantity. The labour outlook is still satisfactory, and the year opens unexpectedly well, in view of all the circumstances.

	Fri., 7th.	Sat., 8th.	Mon., 10th.	Tues., 11th.	Wed., 12th.	Thurs., 13th.
African Farms	7 9*	8 3	8 3*	8 9*	9 3	8 9
Apex Mines	5 3*	5 3*	5 3	5 0*	5 0*	5 0
Aurora Wests	8 6*	8 6*	8 6*	9 0*	9 0*	9 0*
Bantjes Cons.	7 6*	7 0*	8 0	8 3	9 0	8 3A
Brakpan Mines	65 0	68 6A	68 0A	69 6	68 0*	68 6*
Breyten Collieries	23 0†	20 0*	21 0*	21 0*	—	—
Brick and Potteries	—	5 0*	5 0*	5 0*	—	—
Cassel Coals	20 0*	19 9†	—	—	—	19 6†
Cinderella Cons.	4 6*	—	—	—	—	—
City and Suburbans	34 0*	34 6*	35 0*	35 6	36 0*	36 3*
City Deeps	70 6	70 6	70 6	71 6	72 6*	75 6
Cloverfield Mines	6 11	7 0	7 0*	9 9	8 3	8 6
Clydesdale Collieries	13 0*	13 6*	13 0*	—	—	—
Concrete Construction	2 0†	—	—	—	—	—
Cons. Investment	—	—	—	—	16 0†	—
Cons. Langlaagtes	34 0	34 0†	33 6	34 0	34 0*	34 6
Cons. Main Reefs	18 0*	18 3	18 0*	18 3	18 3	18 3
Cons. Mines Selection	14 0	14 0*	—	14 0*	14 0*	14 0*
Coronation Collieries	—	—	—	25 0*	—	—
Crown Diamonds	—	2 0*	2 0*	2 6*	2 6*	—
Crown Mines	58 0*	58 0*	—	60 0*	60 0*	60 0*
Crown Mines Debentures	£98*	—	£98*	—	£99*	—
East Rand Centrals	—	3 5*	3 6	4 3*	4 6	4 6
East Rand Coals	2 4*	2 4	2 4	2 3	2 5	2 5
East Rand Deeps	1 3*	1 2*	1 3*	1 4	1 5*	1 7*
East Rand Minings	8 0*	—	7 6*	—	9 0	9 6*
East Rand Props.	17 6	17 0	19 0*	18 0*	18 3*	18 3*
Eastern Gold Mines	1 4	1 2*	1 3*	1 2*	—	1 4*
Ferreira Deeps	—	—	—	—	40 0†	40 0†
Frank Smith Diamonds	1 6*	2 0†	1 7*	1 9*	1 10*	2 0
Geduld Props.	37 9*	37 3	37 6	37 6	37 6	38 3
General Minings	—	—	—	—	6 6*	—
Glencoe Collieries	5 9*	5 9*	5 0*	5 6*	5 6*	6 0
Glynn's Lydenburgs	—	—	8 0*	8 0*	8 0*	8 0*
Goerz & Co.	—	14 0†	—	—	12 0*	12 0*
Government Areas	31 9	32 6	32 6	33 0	32 6	32 9
Jupiters	6 11*	7 1	7 0*	7 3	7 4*	7 9*
Klerksdorp Props.	—	1 7*	1 7*	1 6*	1 6*	—
Knight Centrals	11 0	10 9	11 3	11 2*	11 0*	10 10
Knights Deeps	—	24 0†	24 0†	—	24 0†	—
Lace Props.	5 3*	5 6	5 3	5 5	5 3	5 3
Langlaagte Estates	—	16 3*	—	—	—	—
Luipaardsvlei Estates	—	6 0*	6 0*	—	—	5 9*
Lydenburg Farms	6 5	7 3	7 6	7 6	7 4	7 3*
Main Reef Wests	—	—	6 9†	6 3	6 9A	6 9*
Meyer and Charltons	95 0*	97 6*	97 6*	97 6*	97 6*	—
Middelvlei Estates	1 0*	1 0*	1 0*	1 0*	1 3	1 6†
Modderfontein B.	115 0	115 6A	116 0	115 6*	115 6*	116 0*
Modder Deep Levels	110 6*	111 0	112 6	113 0	112 6*	113 6*
New Boksburgs	1 6A	1 6†	—	1 9	1 9	1 6*
New Eland Diamonds	9 0*	—	10 0*	11 0*	11 0*	10 0*
New Era Cons.	7 0	7 0	6 9	7 0*	7 6	7 4*
New Geduld Deeps	3 5	3 4	3 5	3 6*	3 7*	4 0
New Kleinfonteins	31 0	29 6A	30 9	31 3	31 3	30 9
New Modderfonteins	312 6*	316 3A	312 6*	315 0*	320 0	325 0†
New Primrose	—	—	—	5 0*	—	—
New Rietfonteins	—	—	—	—	0 3*	—
New Unifieds	—	15 0†	—	17 0†	13 0	—
Orange Diamonds	—	—	—	0 2†	0 1*	—
Pretoria Cements	44 0*	44 6*	45 0*	45 0*	45 0*	45 0*
Princess Estates	3 6*	3 6*	—	3 6	—	—
Rand Collieries	2 6*	3 0*	2 9*	3 6*	3 7	3 6*
Rand Klips	5 8	5 11	6 0	6 10	6 6	6 9
Rand Nucleus	1 9	1 7*	1 7*	1 8*	1 3	1 3
Randfontein Deeps	3 1*	3 1*	3 1*	3 0*	3 1	3 1*
Randfontein Estates	12 6*	12 6*	12 0*	12 6	13 0†	13 0†
Roberts Victors	12 6†	12 6†	12 0†	12 6†	10 0*	—
Rooiberg Minerals	12 9*	12 9*	—	13 0*	13 0*	13 6*
Roodepoort Uniteds	6 4*	—	6 9	7 3	7 3	7 0†
Ryan Nigels	1 6*	—	—	—	2 0*	2 0*

* Buyers. † Sellers. A Odd lots.

	Fri., 7th.	Sat., 8th.	Mon., 10th.	Tues., 11th.	Wed., 12th.	Thurs., 13th.
Shebas	2 0	2 0†	—	—	2 0†	—
Simmer Deeps	—	1 6*	—	—	1 6*	1 10
S.A. Gold Mines	—	11 6*	—	—	—	—
S.A. Lands	3 8	3 8	3 8	3 9	4 0	4 0
Springs Mines	39 9	40 0	40 3	41 6	43 6	43 3*
Sub Nigels	10 0*	10 0*	10 0*	10 0*	10 3	10 6*
Transvaal Coal Trust	49 6	51 6	52 6*	53 0	52 6	51 6*
Transvaal Lands	12 0†	12 0†	12 0†	—	12 0†	—
Transvaal G.M. Estates	27 0†	27 0†	27 0†	27 0†	—	—
Tudors	—	—	—	—	2 0†	—
Van Dyks	2 0†	2 0*	2 3	2 9*	3 0*	3 6*
Van Ryn Deeps	58 3	59 0	60 0	62 0	61 6	61 6
Village Deeps	34 0†	33 6†	33 6†	33 6†	30 0*	34 0†
Village Main Reefs	20 0†	20 0†	—	20 0†	—	20 0†
Vogelstruis Cons. Deeps	1 1*	1 2*	1 3	1 6	1 4*	1 4*
West Rand Cons.	—	—	—	—	—	8 6*
Western Rand Estates	—	—	1 0*	1 0*	1 0*	1 0*
Witwatersrands	51 3*	51 3*	51 0*	52 0	—	52 9†
Witwatersrand Deeps	23 0	25 9*	23 3	23 6†	22 6	23 0†
Wolhuters	10 0	9 9*	9 9	9 6*	9 6*	9 9
Zaaiplaats Tins	8 9*	8 9	8 3	8 6*	10 0	9 0*
Union S.A. 3¾ per cent.	£96 13 9*	—	—	—	—	..
Union S.A. 4 per cent.	£99 1 3†	—	—	—	—	..

* Buyers. † Sellers. A Odd lots.

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Commerce and Industries.

Iron and Steel Bounties.

In his report upon the trade of New Zealand for 1914, Mr. W. G. Wickham, H.M. Trade Commissioner for the Dominion, says it was decided what bounties are to be paid, for three years after the industry is started, on the output of iron and steel. These bounties are as follows:—Pig-iron, 12s. per ton, puddled bar iron, 12s. per ton; steel produced from pig-iron, 12s. per ton; steel produced direct from ore, 24s. per ton. After three years the bounty drops annually by 2s. per ton, and 4s. per ton respectively. A limit is imposed to the total bounties of £150,000, to pig-iron of £75,000, and to the amount payable in one year of £30,000. The weight of scrap iron and steel used has to be deducted.

* * * *

Natal-Zululand Railway.

This company is able to pay a final dividend in respect of the past year of 1 per cent., making, with the interim dividend already paid, 2 per cent. for the year, or the same as for 1913-14. The line is at present worked by the Natal Government for a fixed sum of £13,500, which it hands over to the company quarterly in full satisfaction of all outstanding claims under its original guarantee, such payments to continue until the line is expropriated. The right of expropriation is vested in the Government for an agreed sum of £350,000, and can be exercised at the expiration of completed periods of 10 years, reckoned from June 30, 1907, on giving twelve months' notice. Last year's net revenue balance, after providing for interest on the first and second debentures, was £2,682, a sum equal to about 2½ per cent. on the share capital. The dividend of 2 per cent. calls for £2,163, and there is thus a surplus of £519, which, added to the balance of £733 brought in from 1913-14, leaves an undivided surplus of £1,252 to be carried forward. The only stock officially quoted is the 3 per cent. first mortgage debentures, the prices of which is about 66. The sum which the Government has agreed to pay for the property is equal to the issued amount of debenture capital.

* * * *

British Central Africa.

At the eleventh annual general meeting of the British Central Africa Co., Ltd., in London in mail week, the chairman said: I beg to move that the directors' report and accounts to December 31st, 1914, be received and adopted, and it will not escape your notice that they relate to a period of 18 months, in accordance with the arrangement arrived at, in concert with yourselves, at the last annual meeting. The accounts now submitted include five months of war, but in our case, as in that of so many other companies, the effects have been less prejudicial than might have been expected upon our operations. In order to preserve the just perspective of our various activities, it should first be noted that the Port Herald-Zambesi extension line which is commonly called the Central Africa Railway, has been completed from Port Herald, the terminus of the Shire Highlands Railway, to Chindio, upon the river, and has been open for traffic since May, 1915, Messrs. Pauling and Co. having, with laudable and usual expedition, completed their contract. Construction commenced in April, 1913, when the prospectus was issued, and when the Shire Highlands Railway Co., the whole share and debenture capital of which belongs to ourselves, entered into an agreement to work the new line for a period of ten years from date of opening. Under the contract between this company, and the Nyasaland Government, which was executed in March, 1913, a sum of £180,800 became due in exchange for the subsidy lands granted by the Government as a consideration for the construction of the Shire Highlands Railway. Of this sum £65,000 was received during 1914, in addition to £50,000 previously received. A further instalment of £50,000 was received this current year, the balance of £15,800 being retained by the Government pending the completion of the wharf and station at Chindio, the place on the Zambesi at which the Central Africa Railway and the river meet. The wharf and station are being constructed by the Central Africa Railway, and not by Messrs. Pauling. Our company has now made a giant stride towards the establishment of through railway communication from the Lakes to the Zambesi. Had not war broken out there is good reason to believe that a commencement would have been made with the northern extension from Blantyre to Lake Nyasa, a preliminary survey of which was made several years ago by Sir C. Metcalfe, for Messrs. Sir Douglas Fox and Co.; but progress with the all-important link between the Zambesi and Beira has necessarily been postponed.

WANTED.—Antimony Mine; state location, character and quantity of ores and full particulars. Address Manufacturer, Station C, New York, U.S.A.

"Engineering" gives information regarding the progress of the iron and steel works at Newcastle, New South Wales, which are fully equipped for the manufacture of rails and structural steel from ore supplied from the company's deposits in South Australia. This ore is exceptionally rich, yielding as much as 68 per cent. of metallic iron on an average. An abundant supply of coal is available in the neighbourhood of Newcastle. The works, which are laid out with a view to future extension, are equipped with one blast-furnace, with all the necessary accessories, including a battery of 66 Semet-Solway by-product-recovery coke-ovens, and a pig-casting machine. Steel is made by the Siemens-Martin process, and the ingots, reproduced in a blooming mill, are rolled into rails and structural sections in a rail-mill of the three-high type. When in full swing, the existing plant is capable of producing 400 tons of rails per day. We ("Engineering") understand that arrangements are now being made for the installation of two additional open-hearth furnaces, each capable of producing 75 tons daily, and the capacity of the coking plant is also about to be increased. There need be no doubt as to the existence of a market for the company's products, since, in 1913, the value of Australia's imports of iron and steel goods amounted to £7,592,120, of which rails, bars, girders, and other sections accounted for nearly £3,000,000. Extensive railway construction is also contemplated in the Commonwealth, so that the prospects seem particularly bright. In any case, in making Australia less dependent on imported iron and steel, a valuable national service is being performed, which will undoubtedly do much to enhance the prosperity of the country.

Transvaal G.M. Estates.

The following are the particulars of this company's output for the month of December, 1915:—Central Mines: Tons crushed, 11,100, yielding 5,455·718 fine ozs. Elandsdrift mine: Tons crushed, 1,420, yielding 1,155·342 fine ozs. Vaalhoek mine: Tons crushed, 1,560, yielding 585·047 fine ozs. Estimated value of month's output, £29,774. Estimated profit for the month, £12,729. The additional five stamps at Elandsdrift and the tube mill at Vaalhoek have now been brought into use.

WANTED.—Antimony Ores; state price, percentages, analysis, quantities can deliver monthly and points of delivery. Address Manufacturer, Station C, New York, U.S.A.

The best "Reef Traveller" is the *South African Mining Journal.*

Engineering Notes and News.

MONEL METAL.

[By Chas. M. Biddle, Jr.]*

Monel metal is a natural alloy of nickel and copper, containing approximately 68 per cent. nickel, 1·5 per cent. iron, and 30·5 per cent. copper. By this term "natural alloy" I do not wish to convey the idea that this alloy is itself obtained from the earth. What I do wish to impress is that, in the process of smelting and refining the ore, the nickel and copper are not separated and they appear in the finished alloy in the same relative proportion as found in the ore. A brief description of the ore and process of extracting these metals will explain just what this term "natural alloy" stands for. The nickel ore is obtained from the deposits at Copper Cliff, near Sudbury, Ontario, Canada. It is of that mineralogical classification known as pyrrhotite, which is a sulphide of copper, nickel and iron, and is found intimately mixed with granite rock as an agglomerate mass, and not in the forme of veins, as is the usual case with metalliferous ores of this character. This particular nickel ore has an approximate analysis of 5·5 per cent. nickel and 2·5 per cent. copper, or a ratio of 2⅓ parts nickel to 1 part copper. A very close study of these nickel deposits by some of the most prominent mining engineers shows the geology of this region to be a large basin, some thirty miles long and seventeen miles wide, which during the cooling of this earth crust, was filled in with a very wide strata of this ore of copper and nickel. Along this vast ore body there have been about eight mines opened up, but only one of these is worked extensively. This is an open pit about one hundred and seventy-five feet deep and has an area equal to that of a city block. To show what enormous amounts of metal are contained in this mine, it will suffice for me to say that there has already been removed over a half million tons of ore, and, by means of diamond drilling, a sufficient reserve has been blocked out to supply the world for the next hundred years at the rate of two million pounds of nickel per month. In the metallurgical treatment of this ore the metals are separated from the rock and earthy matter by a process of smelting, using blast furnaces and bessemer converters. By this treatment the nickel and copper are obtained in the form of an impure alloy. In view of this very large supply of nickel and a limited market for pure nickel, the idea was conceived to produce an alloy by bringing the copper and nickel in the ores to a refined state without separating them. The refining of this impure alloy of copper and nickel was by no means a simple task, and it was only after four years of most arduous and painstaking experiments on the part of metallurgists and chemists that it was possible to place on the market an alloy of copper and nickel under the name of "monel metal." In appearance this metal is of a silver-white colour; in fact, it cannot be distinguished from pure nickel. It takes a brilliant finish which it retains indefinitely. On heating or prolonged exposure, this polished surface assumes a gray cast which can be removed by a polishing cloth. It melts at 1,360 deg. cent. (2,480 fahr.). Compared with copper it is about of an equal weight but considerably harder, and yet is so ductile that it can be spun or drawn into the finest wire. It shows relatively smaller expansion and contraction changes than copper, and three times greater tensile strength. The metal can be readily soldered with killed acid, brazed with ordinary brazing solder, and welded either electrically or with oxy-acetylene torch. Like iron and steel, it is produced in cast form or in rolled rods, bars, and sheets. While the physical properties of this alloy excel those of mild steel, still it machines easily. Monel metal finds its greatest uses and possibilities as an engineering alloy owing to its great strength and non-corrosive properties. In rolled and annealed condition it is equal to nickel steel, as the following comparisons will show:—

	Monel Metal.	Carbon Steel Annealed.	Nickel Steel Oil Tempered.
Tensile strength	95,000	80,000	95,000
Elastic limit	56,000	40,000	65,000
Elongation, per cent. in 2 in.	42	22	21

We have here a metal whose strength tests are equivalent to the best rolled steel and with the additional property of incorrodibility. The mechanical possibilities of such an alloy are endless. By speaking of this alloy as non-corrosive, I do not wish to set forth the idea that it is absolutely impervious to all acids or ordinary corroding agents. Such is not the case and moreover, the science of chemistry does not at present know of a metal or combination of metals which is not attacked by some agent. What I do mean by its non-corrosiveness is that, in the majority of cases where steel or acid-resisting bronzes are attacked, the action of the same agent on monel metal under similar conditions is but slight or of no effect whatever. A very interesting test, which fully demonstrates the non-corrodibility of monel metal was an immersion of this alloy in cold 40-deg. sulphuric acid for 56 days. At the end of this period, no loss of weight was shown. Another test, much more severe, was where the metal in finely divided condition, as lathe turnings, was boiled for 48 hours in the same acid as above mentioned; at the end of this time it exhibited a loss of less than 0·5 per cent. In sea water, where bronzes, copper, or steel, exposed alternately to the air and salt water, become rapidly pitted, the metal remains wholly uneffected. Under weather conditions, where the atmosphere is charged with corroding fumes, as about gas houses, smelting plants, or chemical manufactories, roofing of monel metal sheets have fully withstood the test. In connection with various manufactories where chemicals are used, various articles as containers, pumps, etc., made from this metal, have given universal satisfaction. This metal is now commercially produced in a variety of forms, such as ingots, sheets, wire castings. It is in the form of castings that this metal now finds its greatest demand. During the past six years the U.S. Government, through the Navy Department, has made such conclusive tests that this is the best material for marine work, that it is now being specified for such outboard connections of battleships as would be rapidly corroded by sea water. Valve seats and liners for pumps of this metal have been found to be far superior to bronze. Liners show no scoring, and after a short period of use assume a glass-like finish which reduces the packing to a minimum. As evidence of this, a very interesting experiment was conducted by the U.S. Navy on the battleship New Hampshire. A number of pumps were equipped with monel metal liners, rods, and valve seats, other similar pumps were equipped with bronze. At the end of six months the bronze equipment had to be replaced, while the monel metal fittings showed practically no wear. With this test as a basis, the U.S. Navy now requires that pumping equipment of its ships be equipped with monel metal. In connection with very high steam pressure where superheated steam is used, the alternating heating and cooling of bronze or steel valve seats cause them to become granular and crumble away. Monel metal has been given a severe test and found entirely satisfactory. Monel metal castings have found a varied use where chemicals or other corroding agents must be handled, such as in washing apparatus, acid conductors, in refrigerating plants where the ammonia causes rapid corrosion, in handling of mine waters, for pickling apparatus in connection with the rolling of steel sheets and tin plate. Several of the largest mills for rolling steel sheets have recently changed their entire equipment from iron to monel metal. Among such plants may be mentioned the Illinois Steel Co., the West Penn Steel Co., and most notably, the Vandergrift Plant of the American Sheet and Tin Plate Co., which is the largest rolling mill in the world. Rods of rolled monel metal are admirably adapted for use as pump and piston rods. Such rods in service have shown practically no scoring in instances where bronze or steel were rapidly cut away. Repacking is reduced to a minimum, and this, together with its resistance to alternating stresses, make it the best pump rod on the market. In the installation of high tension electric lines, the intense magnetic field surrounding the wires causes a galvanic corrosion of most metals used for poles and hanger rods. The General Electric Co. have made extended tests with monel metal and find rods of this alloy to be the best suited for this kind of work. The rolled metal has been drawn into wire of all sizes down to 40 gauge. This latter is as soft and pliable as a silk thread. In the form of wire, exhaustive tests have been made of the metal for window screen, bed springs, filter cloth, resistance wire for electrical purposes, mine screens and many other purposes where durability and non-corrodibility are essential. Measuring tapes made from it may be used in mines and wet places without the slightest fear of having the marking obliterated by corrosion. Rolled sheets of monel metal find application for cornices, gutters, metal window frames, ventilators, skylights, roofs, mine chutes, and many other purposes. Owing to their great strength and non-corrosive qualities, a much lighter sheet than copper can be used and greater efficiency and service obtained at lower initial cost. In Germany, where conservation is practised in all lines of industry, some of the smaller railroads use a very poor grade of fuel and by reason of this have found it necessary to line the fire boxes of their locomotives with some metal, usually copper. Recent tests with monel metal by some of these companies have shown the superiority of this metal over copper, and caused an entire change of equipment. The metal is rolled into very thin sheets for sheathing for boats, especially motor boats, lagging for boilers, laundry machinery, gaskets, tanks, kitchen utensils, bathroom fixtures, and innumerable applications where high tensile strength with non-corrosive features are essential. Many of you have heard of the yacht, "Sea Call," and also heard of the reports given out in the newspapers, that the monel metal corroded and gave out. We wish to make the statement here, that this is not true. The monel metal has been examined by our engineers and the engineers of other companies; it is as good as the day it was installed. The trouble on this yacht was that they combined steel and monel metal together, using a very small piece of steel, and left this exposed to the elements of the salt water, thus setting up an electrolytic action between the monel metal and steel. We give below part of a letter received from the builders, and the party who tore the yacht apart:—"We have furnished you a section of the stem piece, and the monel sheets adjoining it, which is a very good sample of the relative condition between the steel and the monel, and we can state positively that we have not, in any instance, found any signs whatever of corrosion or deterioration of monel metal in this boat."

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*From the Journal of the Ohio Society of Mechanical, Electrical and Steam Engineers.

The Value of Research Work.

TRIBUTE TO V.F.P. ENGINEERS.

It may be remembered that Mr. Harold Martin, one of the engineers of the Victoria Falls and Transvaal Power Company, shortly before he left for London to take part in munition making, read a paper before a meeting of the South African Institution of Engineers. At the last meeting of the Institution, Mr. Clark, Mr. Martin's chief, read the following extracts from a letter received from Mr. Martin since his arrival in England and his engagement in munition work. In placing the letter before the Institution, Mr. Clark said: "I think that you will agree with me that this most satisfactory statement shows the true value of the class of research work upon which Mr. Martin was engaged here. We, as members of this Institution, can feel proud that one of our members trained here in South Africa has been able to give such excellent service to the Empire in this time of crisis." "We live (writes Mr. Martin) in strange times, otherwise I would not be seated on top of a nitric acid retort in a high explosive factory at four o'clock in the morning supervising a furnace trial with a view to increasing the capacity and efficiency of the plant here. We have been interrupted twice during the night by German Zeppelin air-raids on London, and could plainly hear their bombs bursting and our own guns responding, besides seeing two of the airships as dim and fish-like visions in the night, passing nearly over our factory and heading north-east at a high speed, with the shrapnel of our guns, and probably of our own aircraft, bursting around them. As it was the fourth such raid since our arrival in London, I felt calmer about it, though if they had dropped a bomb here, I fear that there would have been very little left either of myself or of the neighbourhood. One can get accustomed to anything (something like bus-bar faults), and my chief feeling to-night was one of annoyance that our test should even be slightly interrupted when we were doing our best to turn out more explosives to try and deal with these frightful Huns. Incidentally, I would tell you that London keeps wonderfully calm, and that though there are sad casualties, they are in nothing like the large numbers that the Germans appear to think; nor is the damage done to buildings at all significant. Tales of the destruction of railway stations and of big buildings are absolute rot. Regarding my work here, they have had the greatest difficulty in obtaining a fraction of the full output of the sulphuric and nitric acid plants here which are essential to the manufacture of T.N.T. The trouble was mainly due to inefficient firing and control of the plants, so that when I was asked to help to improve matters, in conjunction with a smart young chemist, I found, after my experience with you in South Africa, that I had a very fine chance to make a good show. We very quickly, by the use of draught gauges and commonsense firing and control, obtained much more than the full output of the sulphuric acid plant, so that they were able to shut down part of it for the necessary repairs, and have given up all ideas of extensions. We next turned our attention to the nitric acid plant, which we found a more delicate operation, as there is a decided element of danger in attempting to speed up the process, which was absolutely essential if we were to increase the output of the available plant, and also again avoid extensions necessitating much delay. The result has been satisfactory beyond our best hopes. We are now on our fourth test-run—each takes from 16 to 18 hours—and are getting each process through safely and confidently in about one-third of the time they have been accustomed to take, increasing the plant capacity accordingly. Our results, so far, have been tabulated, curves drawn and blue prints taken, and these are being sent, together with copies of our report, to all the Government plants in the country. It is strange that I can feel that I am doing really good work for the country, largely on account of the training and experience under your guidance."

Sakalava Madagascar Proprietary Oil Fields.

The Sakalava Madagascar Proprietary Oil Fields, Ltd., have received the following cable from their field manager, Mr. G. M. Robinson:—"Depth, 2,240 feet, formation sand. At 2,175 feet best show oil yet found in well. Looking excellent."

"SKEFKO"

BALL BEARINGS.

'Phone 835. **Johannesburg.** Box 654.

Robinson Deep Gold Mining Co., Ltd.

(IN LIQUIDATION.)

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that in accordance with the terms of the agreement between this Company and Robinson Deep, Limited, a distribution of 2s. per share, amounting to £100,000, will be paid on 10th February, 1916, to the Shareholders registered in the Company's books at the close of business on 31st December, 1915.

The distribution will be made to the Shareholders on the South African Register by warrants to be issued by the Liquidators in Johannesburg, and to shareholders on the London Register by warrants to be issued by the London Agents to the Liquidators.

Holders of Share Warrants to Bearer are informed that they will receive payment of the distribution on presentation of their share warrants, with all coupons attached, either at the offices of The Consolidated Gold Fields of South Africa, Limited, 8, Old Jewry, London, E.C., at least six clear days, or at the offices of The Consolidated Gold Fields of South Africa, Limited, 12, Rue de Pyramides, Paris, at least ten clear days, prior to payment being made.

By Order of the Liquidators,

The Consolidated Gold Fields of South Africa, Limited,

Secretaries to the Liquidators.

per G. C. WHITE.

Head Office:
Consolidated Gold Fields Buildings,
Simmonds Street, Johannesburg,
11th January, 1916.

26533

East Rietfontein Syndicate,

LIMITED.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Twelfth Ordinary General Meeting of Shareholders in the above Syndicate will be held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, **on Friday, the 25th February, 1916, at 11.30 o'clock in the forenoon**, for the following purposes:—

1. To receive the Reports of the Directors and Auditors, and to consider the Balance Sheet at 31st December, 1915, and Statement of Income and Expenditure from 1st January, 1915, to 31st December, 1915.
2. To elect Directors in the places of Messrs. D. Christopherson, J. Friedlander, H. Newhouse, W. S. Smits, F. Leslie Brown, and Sir E. H. Dunning, who retire from office in accordance with the provisions of the Articles of Association, but are eligible and offer themselves for re-election.
3. To elect Auditors for the current year, and to fix the remuneration for the past audit.
4. To transact such other business as may be transacted at an Ordinary General Meeting.

The Transfer Books of the Syndicate will be closed from 18th to 25th February, 1916, both days inclusive.

By Order of the Board,

The Consolidated Gold Fields of South Africa, Ltd., Secretaries.

per G. C. WHITE.

Head Office:
Consolidated Gold Fields Buildings,
Simmonds Street, Johannesburg,
6th January, 1916.

26660

The Jupiter G.M. Co., Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Sixteenth Ordinary General Meeting of Shareholders in the above Company will be held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, **on Friday, the 24th March, 1916, at 11.30 o'clock in the forenoon**, for the following purposes:—

1. To receive the Reports of the Directors and Auditors, and to consider the Balance Sheet at 31st December, 1915, and Profit and Loss Account from 1st January, 1915, to 31st December, 1915.
2. To elect Directors in the places of Messrs. D. Christopherson and H. C. Boyd, who retire by rotation, but are eligible and offer themselves for re-election.
3. To elect Auditors for the current year and to fix the remuneration for the past year's audit.
4. To transact such other business as may be transacted at an Ordinary General Meeting.

The Transfer Books of the Company will be closed from the 17th to 24th March, 1916, both days inclusive.

By Order of the Board,

The Consolidated Gold Fields of South Africa, Ltd., Secretaries.

per G. C. WHITE.

Head Office:
Consolidated Gold Fields Buildings,
Simmonds Street, Johannesburg,
6th January, 1916.

26661

The Simmer Deep, Ltd.

(Incorporated in the Transvaal.)

NOTICE TO SHAREHOLDERS.

NOTICE IS HEREBY GIVEN that the Ninth Ordinary General Meeting of Shareholders in the above Company will be held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, **on Friday, 24th March, 1916, at 12 o'clock noon**, for the following purposes:—

1. To receive the Reports of the Directors and Auditors, and to consider the Balance Sheet at 31st December, 1915, and Statement of Income and Expenditure from 1st January, 1915, to 31st December, 1915.
2. To elect two Directors in the places of Messrs. F. Leslie Brown and W. S. Smits, who retire by rotation, but are eligible and offer themselves for re-election.
3. To elect Auditors for the current year and to fix the remuneration for the past year's audit.
4. To transact such other business as may be transacted at an Ordinary General Meeting.

The Transfer Books of the Company will be closed from the 17th to 24th March, 1916, both days inclusive.

Holders of Share Warrants to Bearer intending to vote at this Meeting must comply with the regulations concerning the issue of Share Warrants.

By Order of the Board,

The Consolidated Gold Fields of South Africa, Ltd., Secretaries.

per G. C. WHITE,

Head Office:
Consolidated Gold Fields Buildings,
Simmonds Street, Johannesburg,
6th January, 1916.

26662

FERREIRA DEEP, LIMITED

(Incorporated in the Transvaal.)

REPORT OF THE DIRECTORS

For the Year ended 30th September, 1915.

To be submitted at the Fourteenth Ordinary General Meeting of Shareholders convened for Friday, 25th February, 1916, at 11 a.m., in the Board Room, The Corner House, Johannesburg.

To the Shareholders,
FERREIRA DEEP, LIMITED.

GENTLEMEN,

Your Directors beg to submit their Fourteenth Annual Report and Audited Accounts for the year ended 30th September, 1915, accompanied by Reports of the Consulting Engineer and Manager.

PROPERTY.

No change has taken place during the year in the area of your mining property, which consists of 207.5868 mining claims, the freehold of a portion of the farm "Turffontein No. 21" in extent 143 morgen 32.378 square roods, 2 water-rights and 2 mining stands.

OPERATIONS.

The particulars of the results of last year's operations, the development accomplished, the ore reserves and values are dealt with in the reports of the Consulting Engineer and Acting Manager, to which your attention is directed.

ACCOUNTS.

The working profit amounted to £455,933 5s. 2d. after providing £8,402 as a further allowance for increased freight and insurance of gold from mid-October, 1914, to 31st August, 1915, due to the war. This additional cost has been provided for in the value of gold declared since the latter date. To the above amount of £455,933 5s. 2d. has been added the difference between certain items of Sundry Revenue and Expenditure detailed in the Working Expenditure and Revenue Account, amounting to £7,649 0s. 0d., making a net profit of £463,582 5s. 2d. This sum, together with the balance of Appropriation Account at 30th September, 1914—viz., £366,195 12s. 7d. and £4 2s. 10d. in respect of Forfeited Dividends, making a total of £829,782 0s. 7d., has been dealt with in the Appropriation Account as follows :—

Expended on equipment		£2,013 7 3
Government Taxes, including this Company's estimated proportion of the Special War Levy		59,355 10 6
Bonus Dividend	£245,000 0 0	
Interim Dividends Nos. 25 and 26 ...	416,500 0 0	
		661,500 0 0
		£722,868 17 9
Leaving a balance unappropriated, represented by cash and cash assets, less all liabilities		106,913 2 10
		£829,782 0 7

It has been decided that the Capital Expenditure Account should be closed and that the amount charged to Property, Development and Equipment Account since the amalgamation with the Ferreira Gold Mining Company, Limited, *i.e.*, £11,246 0s. 4d., for additional equipment, should be written back to the debit of "Funds transferred from Appropriation Account." Similar expenditure during the past year, *i.e.*, £2,013 7s. 3d., has been charged direct to "Appropriation Account." It will be realised that the whole of the expenditure on equipment since the amalgamation has been obtained from profits earned, and future expenditure under this head will have to he so provided. The "Property Development and Equipment Account" will now stand at the same figure—£980,000—as at the date of amalgamation, which amount is equal to the issued capital of the Company.

In the Working Expenditure and Revenue Account it will be noticed that a change has been made in the method of showing the Working Expenditure at the Mine which now appears under the heading of "White Wages," "Coloured Wages," "Stores and Materials" and "Other Costs." The change, which was made after careful consideration, is an improvement on the old method, as it is not only simpler, but it enables the Directors and the Management to exercise more efficient control over the expenditure, and a more direct check on the results is obtained.

A Special War Levy of £500,000 on the Mining Industry has been made by the Union of South Africa in respect of its financial year ending 31st March, 1916. This tax, which will be distributed amongst gold mining companies *pro rata* to the amount paid by them under the Mining Taxation Act, 1910, during the same period, cannot be definitely ascertained until all profits tax returns are made to and accepted by the Government. Provision has been made in the Balance Sheet for the estimated amount £19,360 due under the Act, which is payable as regards 50 per cent. thereof on or before 31st December, 1915, and the balance by 31st March, 1916.

Donations at £3,932 1s. 10d. exceed the amount for the previous year owing to contributions towards the various War Relief Funds, etc.

The value of stores on hand has considerably increased; this is due to the accumulation of large stocks of stores essential to the continuation of mining and milling operations.

The cost of mining supplies has increased owing to the war, the result in working costs being equal to about 5d. per ton milled.

A further amount of £750 has been written off Transvaal Government 3 per cent. stock, in order to bring the book value thereof to the market value at 30th September, 1915.

BONUS DIVIDEND No. 24.

Owing to the strong financial position of the Company your Directors decided, on the 1st December, 1914, to make a Bonus Distribution to Shareholders of 25 per cent., amounting to £245,000.

DIVIDENDS.

Two Interim Dividends, Nos. 25 and 26, of 25 per cent. and 17½ per cent. respectively, absorbing £416,500, have been declared by the Board of Directors during the year. The amounts due to registered shareholders, resident in enemy territories, were paid over to the Bank of England for the credit of the Public Trustee in accordance with the official direction of the Custodian in terms of the Trading with the Enemy Amendment Act, 1914 (England).

DIRECTORS.

Messrs. H. A. Rogers and H. C. Boyd retire from the Board, in accordance with the Articles of Association, but are eligible and offer themselves for re-election.

AUDITORS.

You are requested to determine the remuneration of the Auditors for the past audit, and to appoint Auditors for the ensuing year.

GENERAL.

The satisfactory arrangements made with the Bank of England with regard to the realisation of gold continue.

A number of the Company's employees have taken up military duties. Allowances of quarter pay have been made to single men and up to half pay in the case of married men, or single men with dependents.

The Board granted permission to your Manager, Mr. F. J. Trump, to proceed to England with the object of rejoining his former Territorial Regiment. Mr. Trump is now in France with his regiment. During his absence Mr. Paul Selby has been appointed Acting Manager.

Operations for the year have been adversely affected by collapses of portions of No. 2 incline shaft coincident with heavy earth tremors. Particulars were published in the Press, and were given in the quarterly reports issued by the Board during the year. The matter is also dealt with fully by the Consulting Engineer and Manager in their reports. The work of reorganising the hoisting is well in hand and is expected to be completed during the current financial year, at an estimated cost of £30,000, which will be provided out of current profits and charged to Working Expenditure.

The native labour supply at present is satisfactory and sufficient to meet the Company's requirements.

H. C. BOYD, *Chairman.*
E. A. WALLERS,
J. MUNRO,
H. A. ROGERS,
C. MEINTJES,
Directors.

RAND MINES, LIMITED,
Secretaries.

S. C. STEIL,
Joint Secretary.

Johannesburg, Transvaal,
24th November, 1915.

Ferreira Deep, Limited—continued.

BALANCE SHEET, 30th September, 1915.

Dr.

To Capital Account— Authorised		£1,000,000 0 0	
Issued: As per Balance Sheet, 30th September, 1914—980,000 Shares of £1 each			£980,000 0 0
,, Funds Transferred from Appropriation Account— For Expenditure on Property, Development and Equipment in excess of Working Capital provided, as per Balance Sheet, 30th September, 1914		£11.246 0 4	
Less Amount written off Property, Development and Equipment, vide contra		11,246 0 4	— — —
			£980,000 0 0
,, Sundry Shareholders— Unpaid and unclaimed dividends...		£202.624 1 9	
,, Sundry Creditors— Wages, Stores, etc.	£55,477 2 6		
Union of South Africa— Tax on profits, etc.	38,720 2 0		
Special War Levy (estimated). . .	19,360 0 0	113.557 4 6	£316,181 6 3
,, Balance of Appropriation Account— Unappropriated			106,913 2 10
			£423,094 9 1

Note.—There are further liabilities as under:—

1.—On account of shares subscribed for in other Companies, viz.: Co-operative Exchange Yard, Ltd.: £64 per share uncalled on 112 shares	£7,168 0 0
Witwatersrand Native Labour Association, Ltd.: 8s. per share uncalled on 1,047 shares	418 16 0
Witwatersrand Co-operative Smelting Works, Ltd.: 12s. per share uncalled on 1,584 shares	950 8 0
	£8,537 4 0

2.—Native Recruiting Corporation, Ltd., Deposit Account, 10s. per Native on complement of 5,001 Natives.

Cr.

By Property, Development and Equipment— as per Balance Sheet, September 30th, 1914		£991,246 0 4	
Less Funds transferred from Appropriation Account—Balance at credit September 30th, 1914, representing expenditure on Equipment since amalgamation with Ferreira G.M. Co., Ltd., as from December 31, 1911, written off, vide contra		11,246 0 4	£980,000 0 0
			£980,000 0 0
,, Shares in other Companies at cost— Co-operative Exchange Yard, Ltd.: 112 £80 shares, £16 per share paid.. ...	£1,792 0 0		
Rand Mutual Assurance Co., Ltd.: 401 £10 shares, fully paid	4,010 0 0		
W.N.L.A., Ltd.: 1,047 £1 shares, 12s. per share paid	628 4 0		
Witwatersrand Co-operative Smelting Works, Ltd.: 1,584 £1 shares, 8s. per share paid	633 12 0		
Native Recruiting Corporation, Ltd.: 46 £1 shares, fully paid	46 0 0	£7,109 16 0	
,, Stores and Materials— In stock	38,705 16 10		
In transit...	27 17 0		
Cyanide Shipment detained in Foreign Port...	586 11 5		
	39,320 5 3		
,, Live Stock, Vehicles, etc.	755 0 0		
,, Furniture	60 0 0		
,, Share Warrants	334 19 11	40,470 5 2	
,, Sundry Debtors and payments in Advance		17,267 18 1	
		64,847 19 3	
,, Deposits—Fixed and on Call, bearing interest	223,034 15 11		
,, Transvaal Government 3 per cent. Stock ...	52,350 0 0		
,, Cash at Bankers ...	19,801 5 11		
,, Gold Consignment Account	63,060 8 0	358,246 9 10	£423,094 9 1
			£423,094 9 1

RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

H. C. BOYD, Chairman.
J. MUNRO, Director.

To the Shareholders,
Ferreira Deep, Limited.

We have audited the Balance Sheet of the Ferreira Deep, Limited, dated the 30th September, 1915, above set forth, and have obtained all the information and explanations we have required. In our opinion, such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and explanations given us and as shown by the books of the Company.

C. L. ANDERSSON & CO.,
Incorporated Accountants,

SAML. THOMSON,
Chartered Accountant, Auditors.

Johannesburg, 24th November, 1915.

Ferreira Deep, Limited.—continued.

Working Expenditure and Revenue Account for the Year ending 30th September, 1915.

Dr.			
To Working Expenditure at Mine—			
White wages	£182,636 10 7		
Coloured wages	122,392 9 7		
Stores and Materials	199,859 14 8		
All other costs, including purchase of power, native recruiting fees, sanitation charges, insurance premiums, Miners' Phthisis Insurance Fund assessment, Rand Water Board fixed charges, work carried on by outside contractors, etc.	95,849 16 0		
	600,738 10 10		
Less Cost of Treatment Accumulated Slimes	3,551 17 4		
		£597,186 13 6	
,, General Expenses—Head Office—			
Salaries, agency fees and rents	10,439 12 5		
Stationery, printing, advertising, postages, and telegrams	1,219 18 5		
Directors' and Auditors' fees	2,475 0 0		
Licences	2,404 5 0		
Sundry	1,127 2 0		
		17,665 17 10	
			£614,852 11 4
,, Credit Balance on Working for the year carried down			455,933 5 2
			£1,070,785 16 6

Cr.		
By Gold Account	£1,079,187 16 6	
Less Further provision for realisation charges from Mid-October, 1914, to 31st August, 1915, due to war (vide Directors' Report)	8,402 0 0	
		£1,070,785 16 6
		£1,070,785 16 6

Dr.		
To Donations and Contributions to War Relief Funds, etc.	£3,932 1 10	
,, Miners' Phthisis Act—Assessment under Miners' Phthisis Act, 1912, in respect of Compensation Fund	10,255 5 1	
,, Transvaal Government 3 per cent. Stock—Amount written off to bring down book value to market value	750 0 0	
		£14,937 6 11
,, Credit Balance carried to Appropriation Account		£463,582 5 2
		£478,519 12 1

Cr.		
By Balance brought down		£455,933 5 2
,, Profit on Treatment of Accumulated Slimes	£11,557 0 10	
,, Freehold Revenue	1,228 13 6	
,, Interest and Exchange	8,467 12 0	
,, Sundry Revenue	1,333 0 7	
		22,586 6 11
		£478,519 12 1

Appropriation Account.

Dr.			
To Expenditure on Equipment for Year			£2,013 7 3
,, Government Taxes—Union of South Africa—			
Tax on profits	£38,720 2 0		
Special War Levy, estimated amount due for the twelve months ending 31st March, 1916	19,360 0 0		
Income Tax	241 7 1		
		£58,321 9 1	
English Income Tax		1,034 1 5	
			59,355 10 6
,, Dividend Account—			
Bonus Dividend No. 24 of 25 per cent., declared 1st December, 1914		245,000 0 0	
Interim Dividend No. 25 of 25 per cent., declared 23rd March, 1915		245,000 0 0	
Interim Dividend No. 26 of 17½ per cent., declared 18th September, 1915		171,500 0 0	
			661,500 0 0
,, Balance Unappropriated—Carried to Balance Sheet			106,913 2 10
			£829,782 0 7

Cr.	
By Balance Unappropriated—As per Balance Sheet, 30th September, 1914	£366,195 12 7
,, Balance of Working Expenditure and Revenue Account—For the year ending 30th September, 1915	463,582 5 2
,, Forfeited Dividends Account—Dividends unclaimed for a period of five years, forfeited in terms of Clause 127 of the Articles of Association	4 2 10
	£829,782 0 7

RAND MINES, LTD., Secretaries.
S. C. STEIL, Joint Secretary.

Johannesburg, 24th November, 1915.

H. C. BOYD, Chairman.
J. MUNRO, Director.

C. L. ANDERSSON & CO., Incorporated Accountants, } Auditors.
SAML. THOMSON, Chartered Accountant,

PREMIER (Transvaal) DIAMOND MINING COMPANY, LIMITED.

(Incorporated In the Transvaal.)

DIRECTORS' REPORT

For the Financial Year ended 31st October, 1915.

To be submitted to the Shareholders at the Thirteenth Ordinary General Meeting of the Company, to be held on Friday, the 28th day of February, 1916.

To the Shareholders,

Gentlemen,—Your Directors beg to submit their Thirteenth Annual Report, together with the Balance Sheet and Revenue and Expenditure Accounts, for the year ended 31st October, 1915.

PROPERTY.

Your Mining and Freehold Properties remain the same as at the close of the last financial year.

PRODUCTION.

Owing to the contracted market for diamonds since the suspension of operations in August, 1914, it was not possible to resume Mining and Washing during the period covered by the accounts now submitted.

SALE OF DIAMONDS.

During the year your Directors have been able to take advantage of the improved but limited demand for diamonds which set in early in 1915, and have disposed of a considerable portion of the stock on hand at the close of the last financial year.

The Revenue and Expenditure Accounts show the results of these sales after deducting the expenditure for the year.

Your Directors are pleased to state that, as a consequence of an understanding with the other holders of diamonds, pre-war prices have been maintained.

WASHING OPERATIONS.

In view of the reduction in the stocks of diamonds held at the outbreak of hostilities and the increased demand, it has been decided to commence washing operations on a small scale, increasing or reducing the same from time to time, to meet the current market conditions, but some time must elapse before any fresh diamonds can be shipped and placed upon the market, when, it is hoped, the bulk of the existing stocks will have been absorbed.

Your Directors record with satisfaction that it was only by co-operation and agreement, amongst the large producers, that it has become practicable to resume operations, and it is intended to limit the production to actual demand.

FUTURE POLICY.

The conditions that must obtain for a considerable time after the cessation of hostilities make it imperative that much closer relations will have to be established amongst the great producers to limit the output and maintain and increase prices so as to assure reasonable profits.

MINE.

The General Manager's Report is submitted and deals with the maintenance and protection of the Company's property at the Mine.

DIRECTORATE.

Mr. John William Philip and Mr. John Munro retire in terms of the Company's Articles of Association, but being eligible offer themselves for re-election.

AUDITORS.

The Auditors, Messrs. Howard Pim and Hardy, and Messrs. Alexander Aiken & Carter, retire, but are eligible for re-election.

You will be asked to fix the remuneration for the past audit, and to appoint Auditors for the ensuing year.

T. M. CULLINAN, Chairman.
P. ROSS FRAMES,
J. W. PHILIP,
J. MUNRO,
F. C. DUMAT,
G. IMROTH,
W. H. DAWE,
G. W. HOLLINS,
P. RICHARDSON,
P. DREYFUS,
A. A. AURET,
} Directors.

SCHEDULE "A." ADMINISTRATION EXPENSES.

*Head Office		£10,279 3 5
*London Office		2,929 4 4
*London Diamond Office		9,513 15 5
*Mine		21,903 4 0
Paris Agency Charges		89 1 10
Directors' and Auditors' Fees		2,096 16 3
Audit Fees	£1,046 16 3	
Directors' Fees	1,050 0 0	
	£2,096 16 3	
		£51,412 17 9
Less Interest on Deposits, etc.		10,554 8 11
		£40,858 8 10

*These expenses include War Allowances and expenditure on Relief Work.

Expenditure and Revenue Account No. 1 for the Twelve Months Ended 31st October, 1915.

Dr.		Cr.	
To Administration Expenses ... ... As per Schedule "A."	£40,858 8 10	By Diamond Stock ... ... As per last Balance Sheet brought forward.	£593,074 13 9
,, Depreciation on Investments	1,247 15 0	,, Diamond Account ... ... Surplus realized over valuation of Diamonds sold during the year.	23,439 13 0
,, Diamond Stock ... ... As per Balance Sheet, still unrealized, carried forward to next account as Profit in Suspense.	234,298 14 7		
,, Balance carried to Expenditure and Revenue Account No. 2. ...	340,109 8 4		
	£616,514 6 9		£616,514 6 9

Premier (Transvaal) Diamond Mining Company, Limited—Continued.

Expenditure and Revenue Account No. 2 for the Twelve Months ended 31st October, 1915.

Dr.		
To General Equipment		£4,476 18 2
,, Balance		335,632 10 2
Divisible as follows:—		
,, Government of the Union of South Africa:— 60 per cent. carried to Balance Sheet	£201,379 10 1	
,, Shareholders— 40 per cent. carried to Appropriation Account	134,253 0 1	
		£340,109 8 4

Cr.	
By Balance of Expenditure and Revenue Account No. 1	£340,109 8 4
	£340,109 8 4

T. EDINGTON, Secretary.

T. M. CULLINAN, Chairman.
P. ROSS FRAMES,
G. IMROTH, Directors.

Examined and found correct.
HOWARD PIM & HARDY,
Registered Public Accountants,
ALEX. AIKEN & CARTER,
Incorporated Accountants, Auditors.

Johannesburg, December 18th, 1915.

Balance Sheet, 31st October, 1915.

Dr. ASSETS.		
Property		£67,707 10 0
Equipment		12,292 10 0
As per last Balance Sheet.		
		£80,000 0 0
Stores on Hand		0 2 0
Sundry Debtors		2,740 6 1
Diamonds on Hand		234,298 14 7
Stock in London and Johannesburg	£218,116 8 8	
Unrealized Special Accounts	16,182 5 11	
Cash and Cash Assets		517,446 5 11
Note.—This total includes the Cash representing the Trading and Emergency Fund as per contra.		
Investment in War Loan ... ... (£100,000 at 98½.)		98,500 0 0
		£932,985 8 7

Cr. LIABILITIES.		
Capital		£80,000 0 0
		£80,000 0 0
Government of the Union of South Africa		130,735 18 4
60 per cent. Share of amount divisible as per Expenditure and Revenue Account No. 2	£201,379 10 1	
Less re-transferred to Trading and Emergency Funds, being amount appropriated as per last Balance Sheet	70,643 11 9	
	£130,735 18 4	
Sundry Creditors		22,575 13 5
Drafts on London Outstanding		85 0 0
Trading and Emergency Funds... ...		400,000 0 0
Balance as per last Balance Sheet ...	£282,260 13 9	
Add amount re-transferred from Shareholders' Appropriation Account at 31st October, 1915 ...	47,095 14 6	
Add amount re-transferred from Government of the Union of South Africa as above	70,643 11 9	
	£400,000 0 0	
Note.—These two Funds are established under Section No. 4 of the Precious Stones Amendment Act, 1908, Transvaal, and belong to the Crown and the Company in the proportions of their respective shares in the Mine.		
Employers' Liability Fund		10,663 17 9
Reserve against Company's excess liability beyond compensation payable by Benefit Society.		
Profit in Suspense		234,298 14 7
(Not yet divisible) represented by Diamond Stock on hand as per contra.		
Appropriation Account		54,626 4 6
Balance.		
Contingent Liability on Witwatersrand Native Labour Association Shares, 8s. per share on 3,200 shares, £1,280.		
		£932,985 8 7

T. EDINGTON, Secretary.

T. M. CULLINAN, Chairman.
P. ROSS FRAMES,
G. IMROTH, Directors.

AUDITORS' REPORT.

We have examined the above Balance Sheet, and report that we have obtained all the information and explanations we have required, and that in our opinion the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the Company's affairs, according to the best of our information, and the explanations given to us, and as shown by the books of the Company.

HOWARD PIM & HARDY,
Registered Public Accountants,
ALEX. AIKEN & CARTER,
Incorporated Accountants, Auditors.

Johannesburg, December 18th, 1915.

Premier (Transvaal) Diamond Mining Company, Limited—Continued.

Shareholders' Appropriation Account, 31st October, 1915.

Dr.		Cr.	
To Balance Brought Forward from Appropriation Account, Oct. 31, 1914	£13,244 12 7	By Sundry Revenue	£11,454 1 0
,, Amount re-transferred to Trading and Emergency Funds, appropriated as per last Account	47,095 14 6	,, Shareholders' 40 per cent. Share of amount divisible ... ... (As per Expenditure and Revenue Account No. 2.)	134,253 0 1
,, British Income Tax	20,639 5 0		
,, South African Income Tax	10,101 4 6		
,, Balance transferred to Balance Sheet	54,626 4 6		
Note.—The last Preference Dividend paid was for the half-year ending 30th April, 1914.			
	£145,707 1 1		£145,707 1 1

T. EDINGTON, Secretary.

T. M. CULLINAN, Chairman.
P. ROSS FRAMES,
G. IMROTH, Directors.

Examined and found correct.
HOWARD PIM & HARDY,
Registered Public Accountants,
ALEX. AIKEN & CARTER,
Incorporated Accountants, Auditors.

Johannesburg, December 18th, 1915.

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CONTENTS.

PAGE
Notes and News ... 479
Topics of the Week:
The Imperial Treasury and Rand Reconstructions 481
The Progress of the Miners' Phthisis Enquiry ... 481
The War, Mining and Commerce in Central Africa 482
South African Geology in 1915 ... 483
Outside Transvaal Mining Industries ... 484
Randfontein Central Position ... 485
The Miners' Phthisis of the Rand ... 486
Rand Metallurgical Practice ... 488
Gold and Diamond Mining in the Klerksdorp District 489
Some Features of the Rand Gold Mining Industries ... 490
The Golden Age and the Mining Engineer ... 491
Electrolytic Precipitation of Gold, Silver and Copper from Cyanide Solution—III. ... 492
The New Coal-Dust Experiments—III. ... 494
Rhodesian Section:
Latest Mining News ... 495
The Week in the Mining Material and Engineering Trades ... 497
The Week in the Sharemarket ... 499
Commerce and Industries ... 500
Engineering Notes and News:
The Distribution Plant of the Johannesburg Municipal Electric Supply System ... 501
Company Meetings: Van Ryn; Daggafontein Prospecting; Wankie Colliery; Enterprise; Cape Copper; Frank Smith Diamonds; Johannesburg Gold Fields ... i.

Notes and News.

Big Diamond Amalgamation. The prospects of an amalgamation of the diamond mines of the Union, foreshadowed in our last issue, have evoked considerable discussion and brought us some interesting communications, which we hope to print in our next issue. It would seem that the financial difficulties in the way of the scheme are not insuperable, and that the interests of all parties can be safeguarded and advanced by a scheme conceived in a reasonable "give and take" spirit. The only real obstacle in the way of the successful fruition of the scheme will doubtless be the prejudice of the unthinking, who blindly oppose all plans for the co-operation of producers in any sphere, regardless of the general merits of the undertaking. Political interference has always been the bane of industry in this country, and it is, doubtless, too much to hope that any proposals to benefit the diamond industry and the country in general will go through without factitious opposition.

* * * *

A Valuable Compilation. We have received a copy of "Tables and Data for Rand Reduction Works," arranged by Mr. C. O. Schmitt. This is a useful compilation of tables and data for all engaged in mill and cyanide works and assay offices. The tables are available for reference at a glance. With this sheet on the desk or the office wall, there is no necessity to look for tables buried in text books. It should be mentioned that half the profits from the sale are to be handed to the S.A. Red Cross Society. The prices are: Blue print, on linen, for wall use, 24 in. x 37 in., 15s.: photo print, on stout paper, for desk use, 13 in. x 20 in., 12s. 6d. The tables are to be obtained on receipt of remittance from Mr. Fred Rowland, P.O. Box 1183, Johannesburg.

* * * *

For the Miners at the Front. We take the following stirring appeal from the *Mining Magazine* of December, 1915: "Do you realize that every day in Northern France your fellow miners, men who have worked with you or for you, are being hurt, or are barely escaping hurts while engaged in tunnelling under enemy trenches? That in silence, wet and danger far beyond that of ordinary mining, they are spending their lives and energies to keep the enemy from breaking through, and on into our homes? Christmas, and the long, cold wet days following, will be none too cheerful 'somewhere in France' this winter. Don't you want to make it a bit more comfortable for the boys at the Front, to let them know that those at home are thinking of them? If you do, send your box of comforts to Captain Ralph Stokes, of the 174th (Tunnelling) Company, Royal Engineers, B.E.F., or if it is more convenient, send us your bundle or your money. Just ring us up or drop us a line and tell us how much to charge to your account, and we will do the rest. If Christmas has gone before this appeal arrives, do not let that deter you, as there will be many gloomy days to follow. Don't let the other soldiers think that the miners have no friends." The secretary of the Chemical, Metallurgical and Mining Society of South Africa, of which Capt. Stokes is a corresponding member of Council, will be pleased to receive and acknowledge any contributions to forward to Capt. Stokes or to Capt. Gerard Williams. Capt. Ralph Stokes is, of course, well known on the Rand. Capt. Gerard W. Williams, who holds a similar position at the Front and with the Chemical Society, was formerly with the E.R.P. Mines and the Consolidated Gold Fields of S.A.

* * * *

Red Cross Comforts for East Africa. The local representative of Red Cross South Africa, in an interview this week with the Director of Medical Services (Headquarter Staff) of the East African Force, was informed that in addition to the usual clothing comforts for hospitals and ambulances, the principal needs for hospitals during the East African campaign would be socks, handkerchiefs, slippers, pipes, tobacco, cigarettes. These articles from experience gained in previous campaigns, and in the present war on the Continent, are always of the greatest use and comfort to the sick and wounded soldiers. Red Cross South Africa therefore appeals to the public for any quantity of these articles, and in addition for further supplies of pyjamas, shirts, undervests, cholera belts, jug and cup covers, puggarees, tooth, nail and hair brushes, dried fruit, games, such as playing cards, dominoes, draughts, chess, puzzles, writing materials, etc., etc. Gifts, or money to purchase them, will be most gratefully received and acknowledged by the joint hon. secretaries, either at the Houses of Parliament, Capetown, or the Old Municipal Buildings, De Villiers Street, Johannesburg. Addressed labels to attach to parcels may be obtained on application.

* * * *

Alluvial Tin Mining.

Some little time ago we made a note of the fact that the Swaziland Tin, Limited, had treated 961,550 cubic yards of ground by means of electrically supplied monitors and sluices, at an average cost of 4·81d., and an average recovery of 0·715lb. per cubic yard. This compares very favourably with the results obtained in Malaya, whence the following figures have been obtained:—

Year to June 30th.	Ground Treated.	Yield c. yard.	Working Cost c. yard d.
1914	772,798	0·68	4·7
1915	1,967,790	0·57	4·0
1915-16 (4 months) ...	809,000	0·74	3·35

In the last instance the figure of 3·35d. was the estimate exclusive of London charges and depreciation, which are presumably included in the previous figures of working cost.

* * * *

McArthur Antimony Process.

The United Jack Mine is said to have been temporarily closed down in consequence of the failure of the McArthur process for the treatment of the gold-bearing antimony ore. The process, it will probably be remembered, is one in which the ore, after crushing in ball-mills, is discharged into ordinary steel cyanide vats. A hot solution of caustic soda—mainly so at any rate—is passed through the crushed ore for the purpose of dissolving out the antimony which is subsequently precipitated in smaller tanks by the aid of gases from a lime kiln, applied from below on the agitator principle. This is the broad outline of the process which has, of course, minor details of special importance. The leached ore in the vats is subsequently treated by cyanide in the ordinary way to obtain the gold contents. It is stated that the principal defect in the plant lies in the heating problem, inasmuch as a certain minimum temperature is necessary for the satisfactory working of the caustic soda solution. However that may be, it is evidently anticipated that the trouble is susceptible of a remedy, for Mr. McArthur, the inventor, is expected to arrive here shortly with the object of looking into the matter. It is interesting to learn that the plant was originally intended for an antimony mine in Servia, but after the outbreak of the war, presumably it was found convenient to divert the shipment to the Murchison Range. Since it has been erected altogether in conformity with the plans and specifications provided it would appear that it is "up to" Mr. McArthur to do the rest as per contract. The delay involved is, of course, unfortunate, since with a large reserve of ore going 8 dwts. in gold over and above the high antimony content, the proposition is one with splendid possibilities. The collapse of the McArthur process would merely hinder progress for a time for the profitable treatment of the ore could without doubt be satisfactorily effected in other ways, if not quite so conveniently as was anticipated in the present case.

* * * *

Worcester G.M. Co.'s Future.

For the second time in their corporate existence, the Worcester Gold Mining and Exploration Company are confronted with what might be termed a test of endurance (says the *Worcester Standard*). Probably few of the present shareholders remember the first test—when they held the rich Ferreira property on the Rand; and yet the experiences of that time should encourage them to persevere now. They have resolved to liquidate, with "a saving clause," to prevent the liquidator (who happens to be their own chairman) from finally disposing of the property before consulting them again. No mention was made of the fact at Wednesday's special meeting, and it appeared to be quite lost sight of, that they constitute an Exploration Company, as well as owners of the Kentish Mine; and when the latter has been worked out (if it should be, beyond the payable stage) there is, unlike other similar concerns, nothing to prevent them, under their articles of association, from holding together, and exploiting other similar properties. Had this been duly considered, perhaps other possible procedure might have been viewed, and the "loophole" that Mr. Rhodes wished to find, would have at once been discovered, and acted upon. When the company started with the Ferreira property, from which highly satisfactory dividends had been periodically drawn, it was not because it was so worked out that nothing more could be done to recoup the shareholders for their outlay there. It was due to the pressure of the larger and richer neighbouring company, with whom they shared expenses and to a great extent co-operated —whose line of development was along the same section of reef—that the Worcester Company sold out to them. But they did not dissolve as a result of this great transaction, and there was no financial loss in consequence of it. On the contrary, it gave them a new and more healthy lease of life —because they were an Exploration Company, and obtained £90,000 through yielding to the pressure! This sum enabled the then Worcester directorate to wipe off the burden of liabilities that had been accumulating—as in the present instance, and to secure outright the Barberton properties that have since paid out (as the chairman stated) £72,000 in dividends, and £40,000 on liabilities incurred in the course of development. Actually, the shareholders—some of whom have been grumbling because of the prospect of the gold harvest coming to an end—received four times £72,000 in dividends, as for every single share held in the Ferreira property they received four shares in the Barberton mine.

* * * *

Union Steel Corporation (of South Africa).

The Union Steel Corporation's operations in the year to September 30 resulted in a loss of £12,000, making the total debit balance at profit and loss of £47,131. It has to be borne in mind, however, that those operations are only in the preliminary stage, and that since the company started additional machinery and plant have had to be provided, while the most productive part of the works has been seriously delayed, owing to the demands of the Government on manufacturers, while further delays have been caused by the congestion of the transport service, both by land and sea. Nevertheless, satisfactory progress has been made not only in the amount of finished material produced during the year, but also in its quality. It is hoped that the 15-in. finishing mill and the new melting furnace will be producing early in the new year. The works manager anticipates that when all the new machinery is installed the works will be capable of a monthly output of about 1,000 tons of finished material.

* * * *

Koffyfontein Mines.

Like other diamond-mining companies, the Koffyfontein found its activities stopped owing to the war. For only the first four months of the year to June 30 were operations carried on, the total production being 14,499½ carats, which have since been realised for £32,624. Diamonds on hand in South Africa are now reduced to £220. From this standpoint the company is fortunate. At the close of the financial year the company was practically free of all debt. The offices are to be removed to Kimberley. There was a rumour in London in mail week that a large share deal in connection with the company had taken place.

TOPICS OF THE WEEK.

THE IMPERIAL TREASURY AND RAND RECONSTRUCTIONS.

Advice has been received by cable that the Imperial Treasury has declined to sanction the proposal to subdivide the present £4 shares of the New Modderfontein Gold Mining Company, Ltd., into shares of the nominal value of £1 each. It is believed that the Treasury fears that the proposed splitting scheme may encourage speculation in New Modders, and speculation in shares is doubtless the last thing the Government desires at this juncture. The powers assumed by the Treasury in this connection a year ago appear wide enough to embrace a case of this sort where no new issue of capital is involved. The official notice then issued was as follows:—" In connection with the re-opening of Stock Exchanges the Treasury have had under consideration the general conditions under which new issues of capital in the United Kingdom can be permitted during the continuance of the war. It appears to the Treasury that in the present crisis all other considerations must be subordinated to the paramount necessity of husbanding the financial resources of the country with a view to the successful prosecution of the war. Accordingly, they wish it to be understood that until further notice they feel it imperative in the national interest, that fresh issues of capital shall be approved by the Treasury before they are made. The Treasury approval will be governed by the following general conditions:—(1) Issues for undertakings carried on or to be carried on in the United Kingdom shall only be allowed where it is shown to the satisfaction of the Treasury that they are advisable in the national interest. (2) Issues or participations in issues for undertakings carried on or to be carried on in the British Empire Overseas shall only be allowed where it is shown to the satisfaction of the Treasury that urgent necessity and special circumstances exist. (3) Issues or participations in issues for undertakings carried on or to be carried on outside the British Empire shall not be allowed. (4) The Treasury will not in ordinary cases insist upon the above restrictions where issues are required for the renewal of Treasury Bills or other short investments held here and falling due of foreign or colonial Governments or municipal corporations or railways or other undertakings. All applications should be made in the first instance to the Treasury. The Treasury will not be prepared to approve, under paragraph 4 (3) of the temporary regulations for the re-opening of the Stock Exchange, any dealings in new issues which have not been approved by the Treasury before they are made." Plainly, under paragraph (2), there is no " urgent necessity or special circumstances " in the New Modder case, which, as a fact, can without inconvenience be held till after the war. Nevertheless it is noteworthy that these regulations created a big discussion, which has grown the more their far-reaching effects have been realised. There is a real desire not to criticise, nor hamper, the Government in any of its actions, but the strong veto which it has placed upon capital issues would appear to require some modification. Everyone understands and sympathises with the Government in its endeavour to conserve the Empire's financial resources so that it can be in a position to carry on the war to a satisfactory conclusion, and, no doubt, some such rules were needed, merely as a precautionary measure. On the other hand, the very simple maxim that " Money makes money " seems to have been forgotten and, instead of assisting industry to expand and produce more " silver bullets," the Treasury rules, on their face, may restrict it. Local cases in point are the New Kleinfontein issue, and the approaching Daggafontein reconstruction. In the former, the financial difficulty has been temporarily overcome, but in the latter the fear is expressed in some quarters that, should the Treasury not be properly advised, the whole Far East Rand may suffer a real set-back. The Advisory Committee to which, it is understood, the Treasury refers these questions has been subjected to considerable criticism in the London financial papers for passing certain issues, of no apparent national value, and, at the same time, vetoing issues that could plainly be defended on the best possible grounds. That Committee is made up of a number of eminent and worthy London bankers, who should be the last people in the world to turn down any issue that had for its object the increase of the gold supply of the Empire. The fact that the reconstruction of the Daggafontein Company is so plainly connected with the augmentation of Rand gold production, coupled with the fact that the only financing now contemplated is of an entirely private nature, should ensure an uninterrupted passage for the scheme. Indeed, it is argued in some quarters that with the case of the New Kleinfontein before them, those responsible for the Daggafontein resuscitation would hardly have gone so far with their negotiations without " sounding " the Treasury authorities on the prospects of the scheme meeting their approval. The same people, it will be remembered, were successful in securing the Treasury approval for the financing of the Springs Mines. Though the Imperial Treasury may be fully justified in withholding sanction of any mere share-splitting proposal like that of the New Modder, it is to be hoped that it will recognise that a scheme like that of the Daggafontein Company is in quite a different category; and its fruition is both urgent and vital. Our older outcrop mines are every day drawing nearer to exhaustion, and if the approaching loss of their contribution to the output is to be made up, it behoves us to hasten the development of more producers on the Far East Rand. The report of the Dominions Royal Commission will furnish the Treasury with ample evidence of the importance to the Union of an undiminished mining industry; and of their own knowledge and experience, the Advisory Committee of the Treasury will be aware of what an unimpaired gold output means to the Empire now and in the immediate future. Wherefore, we can safely trust the Imperial Treasury not lightly to put obstacles in the way of the advancement of the Rand mining industry.

THE PROGRESS OF THE MINERS' PHTHISIS ENQUIRY.

If the Select Committee on Miners' Phthisis fails to reach most important conclusions on that vexed question, the fault certainly will not lie with its own energetic spirit of enquiry or with the earnest co-operation of the mining industry. In the comparatively few days that have elapsed since the Select Committee began its labours, it has shown itself a remarkable glutton for information. It has taken evidence from most of the public bodies, Capitalist and Labour, connected with the industry; from expert authorities as well as from the noble army of cranks; and has collected a volume of data illustrative of the experience and views of every class of the industry. Institutions such as the Miners' Phthisis Sanatorium and the Institute of Medical Research have been seen; medical men directly and indirectly connected with the industry examined; and mines visited on divers occasions and in varying circumstances. Not least valuable, of course, has been the accumulated evidence of the Miners' Phthisis Prevention Committee, and the experience of the individual members of the Committee, doubtless, freely placed at the disposal of the Select Committee. The result of all this activity cannot fail to be of the first importance. Whether it will lead to any increase in the compensation to miners' phthisis victims is, however, doubtful. Rather is it likely that reform will take the shape of a scheme or proposal to make the compensation now payable suffice to set up the recipient in some suitable, light occupation, or in a way to make a living. In this direction all are agreed there is most to be done. The industry, of course, is entirely sympathetic; and if the Committee can evolve a workable scheme it will have amply justified its existence. At the same time, it is to be hoped that it will not neglect the several opportunities for reform presented by the working of the Phthisis Compensation Act under present circumstances. If there is one thing more than another that has come out clearly of late in connection with the phthisis evil, it is the large part played by contributory tuberculosis. The whole system of medical examination calls, therefore, for revision; and the haphazard methods of to-day must be replaced by a system less open to abuse. Then there is the Miners' Phthisis Compensation Board. Two years ago, on the subject, we wrote:—

> It is the policy of concession to the Labour Party that has surrounded the doings of the Miners' Phthisis Board with a mystery and a secrecy which discredits the Board and encourages the men to be dishonest. It is quite clear that what is wanted is the full light of publicity on the doings of the Miners' Phthisis Compensation Board. Surely it is not unreasonable to ask that the names of those who have been benefited under the Act should be issued to the Press. It is no more than is done by other departments of State, as, for instance, in the case of the Pension List, where the beneficiaries draw upon the public purse. The total sum distributed by the Phthisis Board must by now run into seven figures, and it is contrary to all precedent and equity that the allocation of this vast sum should remain wrapt in mystery.

Since the foregoing protest was registered it has become increasingly evident that the attraction of high compensation, which can be got on what many men look upon as comparatively easy terms, has led to the employment of fraudulent devices in order to secure a favourable decision from the Miners' Phthisis Board; and there are grounds for believing that compensation has in many cases been awarded to men who were not suffering from miners' phthisis at all. In fact, cases have arisen where men have received the full amount of compensation, and have later on been passed by different medical men as fit for underground work, and have actually been employed underground. In these directions, therefore, we look for real constructive work as the outcome of the investigations of the Select Committee. First, there will, doubtless, be evolved a scheme to help the victim to turn to the best advantage the monetary compensation now so often squandered. Second, the whole system of medical examination in connection with the working of the present Act must be reformed; and, third, the methods of the Compensation Board must be put on a proper, businesslike footing. More than this no Select Committee or Commission, however composed, can be expected to do; less than this argues that the available evidence has not been properly assimilated, or that its points have not been adequately emphasised.

THE WAR, MINING AND COMMERCE IN CENTRAL AFRICA.

Schemes for the economic development of Central Africa progress but slowly, and, having regard to the distance of the high inland plateaux from the coast (plateaux which, comparatively speaking, are healthy) the deadliness of much of the littoral belts both east and west, and the unhealthiness of the majority of the river valleys, this is not to be wondered at. A further factor that has helped to retard commerce and colonisation has been the gradual drying up of some of the more important lakes and their effluent rivers which in the past gave access to the interior. Particularly true is this of Lake Nyasa and the Shire River. In addition, the war, with all its chaotic and upsetting influences, has in several ways contributed towards a state of affairs tantamount almost to industrial stalemate. Vast sums of money are required for Central African projects, and the conflict in Europe has cut off the necessary financial supplies. And in various other directions the campaigns against the Germans in South-West and East Africa have disorganised all matter relating to peaceful industry in the interior. Yet, strange as it may seem, it is true that in other ways the existence of a state of war in Central Africa has probably assisted in the industrialisation of the great resources of the interior. Naturally no peaceful harvest is likely to be reaped until hostilities in this part of the world are at an end, and there can be no really marked development until the European struggle is over and money markets are again able to give heed to areas that warrant the expenditure of large sums of capital. In the first place, the elimination of German rule, and all that German rule connotes, will be of inestimable benefit to industrial Africa. Germany, it is true, spent large sums of money in East Central Africa on railroad and other projects. But the end in view was always military conquest, and strategy was always placed before commerce in her plans of colonial expansion. The German Colonial railways and lake services may have had their commercial value, but that value was wholly subordinated to the dream of seizure of British and Belgian territory, and under the more pacific rule that is to be in the future, a far greater industrial development will be practicable than was ever possible under the domination of the mailed fist. Another consequence of the war which will be bound to have a beneficial result will be the better understanding that is certain to exist between Belgians and Britishers. No one who has much knowledge of the heart of Africa will contest the statement that previous to the war considerable animosity was often shown by Congo officials and residents toward English-speaking individuals and their enterprises in that country. Admittedly a large number of adventurers and native exploiters of the worst type have left South and East Africa for their country's good in the past and have damaged the good name of Britons. But on the other hand many honest and industrious Britishers were prevented from engaging in purely legitimate enterprises because of the Belgian prejudice. But to-day Britons and Belgians are not only fighting side by side in Flanders but in Central Africa itself, and the spirit of camaraderie so born will certainly assist in the opening up of Belgium's vast and wealthy Colonial asset when the war is over. Still another consideration directly resulting from the war merits attention. The passage of troops to various points of the theatre of operations, with all the transport of supplies that movements of troops call for, will develop or at least partially develop routes of access which in the future will become regular channels of trade. And, furthermore, it is probable that the war, when it is over, will leave behind a considerable number of new colonists in the conquered and adjacent territories. With the exception of the great cupriferous deposits of Katanga in the southern portion of the Congo Belge, and in a lesser degree the mixed lead and zinc areas of the Rhodesia Broken Hill Development Company in North-West Rhodesia, Central and East Central Africa, so far as is known at present can scarcely be regarded as an important mining territory. At the same time the countries under consideration possess considerable potentialities as mineral producing areas. German East Africa contains two or three gold fields of some promise in its North Central part, and to these, space has been devoted in previous issues of this journal. British East Africa has thus far only evolved a soda deposit, and Uganda is without any productive mineral industry. To the east of the latter Protectorate in the vicinity of Lake Albert Nyanza, the Kilo gold fields in the Congo Belge promise to become an area of importance. Nyasaland was visited a few years ago by a Commission sent out under the aegis of the Imperial Institute and the leadership of Professor Wyndham Dunstan. Professor Dunstan's report was not particularly encouraging to mineral enterprise, and so far his views have not been contradicted. The Protectorate contains, however, mica and graphite, but not apparently in large quantities. There are also indications of the existence of cassiterite and zinc blende (sphalerite) in some portions of the Shire Highlands. North-Eastern Rhodesia contains at least one minor gold proposition at Sassare in the lower Luangwa Valley, and in the adjacent territory of Portuguese Zambezia gold is being or has been produced at Chifumbaze Missale and Muchinga, whilst graphite is found in Portuguese Angoniland. With the cessation of war it is by no means improbable that much more attention will be given to these and various other enterprises than has been accorded them in the past. The day is not now far distant when there will be a continuous Britain in Africa from Cape Agulhas to the Great Pyramid. The All Red route through the Continent will become a reality, and with it will come a development of trade routes and industries and an extension of railways such as the interior has not yet witnessed. And in this epoch of new activities the mineral industry will certainly play a part.

SOUTH AFRICAN GEOLOGY IN 1915.

Survey Work on the Witwatersrand—The Geological Society of South Africa—Union Geologists in the Field Last Season.

In the field of geology, no less than in other departments of scientific enquiry in South Africa, the war has hindered progress to some extent. The past year has been notable, nevertheless, for an important addition to our knowledge of the Upper Witwatersrand System and for a valuable monograph upon the stratigraphy of the System in the East Rand, which may be said to have settled, finally, most of the outstanding problems of importance in connection with the geology of that area. For this we are indebted, of course, to the labours of Dr. E. T. Mellor, of the Department of Mines and Industries, whose extensive and very intimate acquaintance with the various features of the Witwatersrand System, gathered during a detailed investigation which has extended over several years, has established him as an authority whose opinions must of necessity carry far more weight than can reasonably be attached to the views of others who may be said, comparatively, to have studied the subject in a superficial kind of way. There is still much to be investigated in connection with the more distant areas of the Witwatersrand basin, as it may be called. There is the somewhat complicated geological region around Potchefstroom and Klerksdorp, where there are still possibilities in the way of a gold mining industry; the more distant field along the Vaal River, where many thousands of pounds have been spent in exploratory work, and where occasional patches of profitable banket have been discovered to exist over many miles of country; and, finally, the interesting and practically unknown land beyond Heidelberg, where the exploits of the famous Coronation Syndicate did much to bring discredit upon an area in which there must, nevertheless, be many thousands of claims that are capable of yielding dividends to properly directed enterprise. It is, indeed, asserted by some who have done unobtrusive prospecting in that neighbourhood that many miles of unquestioned Main Reef beds lie hidden at a little depth below the soil, and that they carry gold values that compare quite favourably with those of the Witwatersrand proper. It is evident, therefore, that with all these industrial potentialities still to be considered, the work entrusted to Dr. Mellor has not by any means come near to its end. It has, however, been greatly facilitated by the amount of knowledge already obtained, and it may be expected, therefore, that the progress of the Survey in the outer districts will be fairly rapid.

GENETIC CONSIDERATIONS.

A new and by no means unimportant element has been introduced into the discussion of the economic aspect of Rand geology in the shape of a definite and well supported theory of Dr. Mellor with reference to the origin of the gold in the banket. Until comparatively lately, questions of this kind were generally looked upon, even by geologists of standing, as being more of academical than of practical interest. The problem of the source of the precious metal is now, however, admitted to be one of little less moment than that of the proper correlation of the various beds of the Witwatersrand system, for thereupon hangs to some extent the question of the continuity of " values " in depth, which has been dealt with separately by the Institution of Mining and Metallurgy. Now that the necessity of providing for an extension of the lives of the deeper levels is engaging the attention of the mining groups, the matter of the richness or otherwise of the ore bodies beyond the limits of present-day mining is something that demands serious thought. Dr. Mellor's views upon the subject provide the groundwork for a special investigation that may well be carried out simultaneously with that of the mapping of the Witwatersrand System, and doubtless will be to some extent. It offers a field for enquiry, however, which is much beyond the scope of the Geological Survey, as at present constituted, and in spite of the fact that the inauguration of such an enquiry might create a panic upon the sharemarket, as Mr. T. A. Rickard humorously suggests, it is one that should be undertaken without unnecessary delay. We have referred above to the discussion of the subject by the members of the Institution of Mining and Metallurgy. The discussion formed part of a wider one which followed upon Mr. Rickard's contention that the richness of lodes, generally speaking, diminishes in depth. Although his paper dealt with the subject broadly, and included evidence from all types of ore deposits, there can be little doubt that the Witwatersrand bankets were chiefly in the mind of the writer when he prepared his evidence for publication. It is much to be regretted, therefore, that the opportunity was not taken of arguing the proposition thoroughly as far as the bankets were concerned. Doubtless the wide scope of Mr. Rickard's paper is greatly to blame for this want of concentration upon so important a section of it.

LOCAL CONTRIBUTIONS TO KNOWLEDGE.

Apart from papers relating to the Geology of the Witwatersrand system, there were several others of South African interest which were read at various meetings of the Geological Society of South Africa. They were as follows:—Anderson, C.: " Description of a Carbonaceous Mineral occurring in the Witkop Mine, near Zeerust, Transvaal." Anderson, Wm.: " On the Zinc and Lead-ore Deposits near Zeerust, Western Transvaal, South Africa." Macgregor, A. M.: " Notes on a Graphic Intergrowth of Diopside and Ilmenite from the Bembesi Diamond Field, Southern Rhodesia." Rogers, A. W.: " Notes on the occurrence of Radioactive Minerals in South Africa "; " The Geology of Part of Namaqualand." Wagner, P. A.: " The Dwyka Series in South-West Africa." These, together with Dr. Mellor's papers on " The Upper Witwatersrand System " and " The East Rand," will be published in the volume of the Society's Transactions at an early date.

THE UNION GEOLOGICAL SURVEY.

For reasons which are doubtless associated in some way with the difficulties caused by the war and the rebellion, the annual geological report of the Department of Mines and Industries of the Union for 1914 has not yet been published. The work of the Survey has nevertheless been carried on more or less as usual. During the past field season of 1915 Dr. Rogers, who was previously busy in the Namaqualand area, as will be seen from the report for 1913, and from his paper mentioned in the list above, transferred his activities to the Prince Albert Road neighbourhood, which is known to us more especially by reason of its sporadic gold output during many years past. Dr. Humphrey was still in the Vryheid district, where he has done a good deal of detailed work during the last year or two. Some valuable monographs by him upon the Wakkerstroom and Utrecht and Pongola districts, as well as upon a portion of the Ngotshe division of Northern Natal, have, it will doubtless be remembered, already appeared in the later reports of the department. Mr. A. L. Hall has been continuing his survey in the direction of Barberton—a most important piece of work—his last report, published in the 1913 report, dealing with the geology of the country north-east of Carolina, where asbestos, among other things, is a mineral of some economic value, and with a part of the Barberton and Swaziland areas. Mr. Du Toit has carried out an investigation of the Eastern Transkei and Umzimkulu districts, where there is a great deal of extremely interesting geology, and Dr. Mellor, of course, is still in the " Reef " area. Altogether, then, since the last reports were issued by the Mines Department, a large extent of ground has been covered by the Survey, and the result of the work will doubtless be looked for eagerly by those who recognise its genuine value as a means of making known the mineral resources of the State. One cannot conclude without a brief tribute of respect to the memory of the late Mr. Kynaston, the first director of the Survey, to whom much of the success of its early years is unquestionably due. His death last year at a comparatively early age was a loss that was deeply mourned by his colleagues and by a wide circle of scientific friends both here and abroad.

OUTSIDE TRANSVAAL MINING INDUSTRIES.

Asbestos and Mica—The Carolina and Leydsdorp Mineral Areas—Further Enterprise Needed.

The monthly report of the Department of Mines and Industries for October shows that some 10 tons of asbestos, valued at £500, were produced in the Transvaal during that period. In the following month nothing was done, and enquiries have elicited the information that the shipping of the mineral from the Carolina district, where it is mined, is of a somewhat spasmodic character. The principal occurrence, that on the farm Diepgezit No. 33, belonging to the Carolina Asbestos Company, Ltd., has not been worked for some months past. As was stated at the last meeting of the company in November, "the property still remains on lease, but no work of any description was done by the lessee during the year." One of those prominently associated with the working of the lease was interned, we understand, at the beginning of the war, and it is not unlikely therefore that this circumstance has led to the suspension of work upon the property. Another mineral product of the Transvaal which attracts attention in recent returns is mica. From the November statistics we learn that about £150 worth were shipped during the month, and the circumstance is interesting in view of the fact that no previous shipment is recorded later than the year 1912, when the quantity listed was quoted at £363. The want of adequate transport facilities has had much to do with the neglect of this industry, but since the completion of the through line between Komati Poort and Zoekmakaar the possibilities of mica mining have been more favourably considered, and a movement is afoot, as is evident from the Mines Department returns, to recommence operations again under the improved conditions which now present themselves. That want of enterprise has probably had something to do with the neglect of the mica deposits in the past may be inferred from what has been done elsewhere in Africa. As far back as 1909 there were no fewer than 35 mica mines in operation in German East Africa, employing about 500 men. The properties were located in the neighbourhood of the Uluguru Mountains near Morogoro, and there were some smaller concerns at the north end of Lake Kivu. In our issue of the 20th of November last it was stated that the chief development of the industry in that region has occurred during the last 10 years, but that the output is smaller than that of India. The fact that it is compared with that of India at all shows that some progress must have been made. The mica is said to excel in splitting quality, and, in the best grades, to yield smooth, perfect sheets that are preferred for use as diaphragms in phonographs. For all-round purposes, however, the mica deposits in the Leydsdorp district are reported to excel those in German East Africa, and if this be so, the conclusion to be drawn is that enterprise has been wanting in the one instance and ample in the other. The result of a similar spirit in the case of asbestos mining may be quoted from Griqualand West, where nearly £26,000 worth of the mineral was produced in 1914, and at least an equal quantity during last year. There is a considerable demand for both mica and asbestos in the European markets, and the certainty that the demand will be increased rather than diminished in the near future is a circumstance that is well worthy of consideration in connection with the mineral deposits in the Union of South Africa.

Asbestos Near Carolina.

The deposits of asbestos, of the variety known as chrysotile, occur on the farms Diepgezet No. 33, Goedverwacht No. 32, and Rietfontein No. 70, which adjoin one another and lie in a direct line some 15 miles east of Carolina. The distance by road from Carolina to the Diepgezet workings is about 22 miles. The asbestos country occupies high mountainous ground which forms part of the great Drakensberg Range, and is much dissected by valleys and kloofs. The asbestos is found in serpentinized dolomite of the Transvaal System, not far below the junction between the Pretoria and Dolomite Series, and the occurrence is evidently associated genetically with the presence of an intrusive sheet of diabase, for it has been noticed that wherever a clearly-defined asbestos body has been located the intrusive sheet has been found to underlie it directly, although the converse is not always the case. From various reports on the occurrence of asbestos that is worked upon a commercial scale, it appears that the mineral is nearly always associated with serpentine rocks. An exception seems to present itself in Griqualand West, where the mineral is not found in these conditions. In the Carolina district the chrysotile is confined to the few feet of serpentinized dolomite which lies upon the intrusive sheet, and runs in thin seams parallel with the bedding planes which dip at a low angle from the horizontal. According to the latest available information the seams are worked in stopes about 30 inches wide, and the grading of the mineral is as follows: First quality, A., down to 1¼ inches; second quality, B., 1¼ inches to ¾ inch; third quality, C., from ¾ inch to ½ inch. Occasionally seams 4 inches wide are found. Figures obtained some considerable time previously showed that the average stoping width was 40 inches, the average width of asbestos seams was 0·92 inch, and that along a face of 1,300 feet 19 per cent. of the product was ¼ inch or less in length; 33 per cent. from ¼ inch to 1 inch, and 48 per cent. over 1 inch. A good deal of stuff in seams below ½ inch is discarded, owing doubtless to the fact that the mineral is prepared simply by hand processes, so that there must be a large quantity of asbestos that would be recoverable by means of a properly designed mill, with crushing and screening plant. It is interesting to note that F. Cirkel, in his well-known monograph on asbestos, states that in Canada, where the greatest quantity is produced, at least 20 per cent. of the ore mined, with a maximum of 80 per cent., goes to the mill, an average being 30 to 60 per cent. From this 6 to 10 per cent. of fibre is extracted in the Black Lake vein quarries, and 7 to 12 per cent. in the Broughton quarries. The percentage of crude fibre produced is estimated at from 0·25 to 75 per cent. of the rock mined. Attention may be drawn to an article on "The Market for South African Asbestos," which appeared in this journal on 2nd October last.

Mica Near Leydsdorp.

The mica fields in the Leydsdorp district have been referred to recently in the *S.A. Mining Journal* in an article on the geology of the neighbourhood, and also by Mr. W. T. Hallimond, who said, with regard to the mica itself, that "The price of good electric mica, of 4 inches by 1½ inches, or over, averages 5s. per lb., or £500 per ton of 2,000 lbs., so that with economical quarrying and careful splitting, grading and cutting of the mineral, there is a field in the Low Country where capital can be profitably invested, and a fairly quick return be looked for." Everything depends, of course, upon the quantity that is available, and upon the cost of mining and preparing the product for the market. There are some 60 miles of mica-producing country running east and west above the northern bank of the Olifants River, but only in certain parts, apparently, have qualities of special excellence been opened up. The uses of mica may be divided, roughly, into two classes—firstly, those of a substance that is transparent and unaffected by heat; and, secondly, those of a material that is useful in electrical machines by reason of its unrivalled insulating power. The Leydsdorp mica is practically identical in character with that of Madras, which includes both classes. Experience in well-established mica mining districts in other parts of the world shows that, under normal conditions, at least 1,250 lbs. of dressed mica must be extracted from each 100 tons of rock mined, at a less depth than 300 feet, and where quarrying is practised, 750 lbs. per 100 tons of rock mined, if the undertaking is to be profitable. That is to say, considerably under 1 per cent. of dressed mica is required in either case. We have no figures relating to the percentage of dressed mica which can be taken from the Olifants River pegmatites, but that the proportion of mineral must be comparatively high is shown by the estimate made under actual producing conditions several years ago, that working costs ran out at £75 per ton of finished mica landed in London, the price obtained for the consignments sent at that time being £160 per ton. To this must be added, obviously, the cost of development in advance, and more recent figures show that on the basis of actual work the total cost, including opening up, should not exceed £180 per ton. This is said to be a liberal allowance. Compared with shipments from Madras, which were reported to average 16 per cent. of sizes running from 1 by 4 inches and 2 by 3 inches, and 84 per cent. below, the Leydsdorp district shipments yielded 62 per cent. of the over sizes and 38 per cent. of the smaller stuff. The cost of mining is of necessity higher in this area than in the Madras field, by reason of the more expensive labour, but this condition would be more than balanced, it would seem, by the greater yield of large sizes from the former district. The output of dressed mica of all kinds from India averages between 2,000 and 3,000 tons per annum, and since in the matter of quality and size the Leydsdorp product is apparently quite equal to that of the best class of mines anywhere, it will be interesting to learn how it stands in the matter of percentage of mineral to rock mined. There is a large margin between £180 as representing total cost, and £500 as average selling price per ton, and if the yield from the pegmatites can be regarded as being likely to be fairly permanent over large areas the prospects of a settled industry should be distinctly favourable.

RANDFONTEIN CENTRAL POSITION.

Brief Report of Operations in Respect of 1915—The Taxation Incubus—"New System of Working" Introduced.

The directors of the Randfontein Estates Gold Mining Company, Witwatersrand, Ltd., and the Randfontein Central Gold Mining Company, Ltd., regret the impossibility of declaring a final dividend in respect of 1915 operations. A résumé of revenue and expenditure for the past year is submitted, in which December results are estimated:—"The revenue for the year amounted to £2,858,786, the addition of the unappropriated balance from 1914 £101,362, and £150,000 realised by the sale of 150,000 reserve shares to meet expenditure on capital account, makes a total of £3,110,148. This amount has been appropriated and spent as follows: Working costs, £2,204,588; dividend, 2½ per cent., declared June, 1915, £108,592; capital expenditure, including shaft sinking, £217,000; development, £103,000; debenture interest, £171,648; debenture redemption, £86,400; contributions to miners' phthisis funds, £48,600; rates, taxes, licences, and sundries, £28,000; reserve to meet war charges on gold for twelve months ended September, 1915, £27,900; profits tax and special levy, £66,000; total, £3,061,728; leaving about £48,420 unappropriated and carried forward. Working costs have increased, owing to abnormally high prices of stores due to war, and water difficulties early in the year, by 1s. 2½d. per ton, equivalent to £150,000. The amount of taxation on this company for miners' phthisis is about four times as much as it should be to compensate the number of cases where phthisis has been directly contracted at Randfontein. During the three and a half years since the Phthisis Act has been in force the compensation which this company would be liable for for phthisis cases contracted in its mines would be about £46,200, but the company has already been compelled to pay no less a sum than £178,000. This exorbitant charge is iniquitous, and the company is now taking action before the Parliamentary Select Committee, with a view to urging alteration of the law bearing on the subject. As regards the profits tax imposed by the Union Government, this, also, is a very serious and unjust burden placed upon the company's operations. To give an instance: our net profits for the year 1914 amounted to £187,258, and the Union Government claimed no less than £57,886 profits tax, which works out at 31 per cent., instead of 10 per cent. Then, again, the Union Government has imposed an additional special levy of £500,000 on the gold mining industry, which brings this company's profits tax up to no less than 50 per cent. on the profits of the company. This year the imposition of the profits tax will be even more severe, as the company has actually made no profit; yet the Union Government, according to its calculations, will no doubt claim some £66,000 profits tax and special levy. Under these circumstances it will be seen that the Randfontein mines are very seriously handicapped, and strong representations are now being made to the Union Government in respect both of miners' phthisis assessments and profits tax. The Randfontein Central Company is now introducing a new system of working mines, which will come into force early next year, which the board fully anticipates will have a beneficial effect on the company's future operations."

German War Finance.

Lord Inchcape, President of the Institute of Bankers, delivered his inaugural address to the members of the Institute, at Goldsmith's Hall, London, E.C., on the 23rd ult. "Whatever differences there existed as to details," he said, *inter alia*, "there appeared to be a consensus of opinion that the money for the war had been raised in this country by sound means. Whether we have raised a sufficiently high proportion by taxation, and whether the increased taxation was imposed at a sufficiently early stage, are points upon which there is considerable difference of opinion; whether the levy on capital by means of the excess profits tax is altogether orthodox is questionable. It means a withdrawal from reproductive investment which would have produced a taxable revenue, and it cannot but have an injurious effect on enterprise, energy, and initiative. But apart from this we have avoided the slippery path on which our enemies have embarked. The military organisation of the German Empire has been such as would have aroused the admiration even of her enemies had her aims been less sinister and her methods less brutal; but her financial policy, so far as we are able to judge it from the imperfect data which are allowed to be known, bears the marks of recklessness and improvidence. None of the money required for the war has been raised by increased taxation. The whole system is so arranged as to avoid the glare of publicity on the slippery path of financial rectitude. Each successive loan means a fresh inflation of the currency, which shows itself in a steady and sustained rise in prices. The more the procedure is persisted in, the more will prices rise, and all official attempts to fix minimum prices, though they may be successful for a time in the case of individual commodities, will be powerless to meet the situation. The task of redeeming the securities and retiring the notes will be left for an exhausted and defeated nation to face after the conclusion of peace."

Mr. Solly Joel, interviewed by the *Financial Times*, declared that the Far Eastern Rand was the Rand of the future. He believed that after the war working costs would be decreased, and expressed the opinion that Johannesburg was in exactly the right position to act as the distributing centre of South Africa.

THE MINERS' PHTHISIS OF THE RAND.

[By WILFRED WATKINS PITCHFORD, M.D., F.R.C.S., D.P.H.]*

THE gold mining industry is at the present time the most important industry of South Africa. Like so many of the principal industries of the world, it has its special industrial disease, and the nature and characters of this particular disease cannot fail to be of engrossing interest to all Africanders of liberal mind. The limitations of the space at my disposal preclude any exhaustive treatment on the subject; I propose, therefore, to omit all reference to the statistical and economic sides of the matter, and to review briefly the salient points in the causation of the disease, and the essential characters of the changes which it produces in the lungs. Considerable misunderstanding exists as to the exact scope of the terms pulmonary silicosis and miners' phthisis. In general it may be said that although the terms are synonymous, the technical discrimination lies in the fact that pulmonary silicosis, or briefly silicosis, does not become miners' phthisis until the affected lungs are invaded by the tubercle bacillus. Pulmonary silicosis implies an excess of silica in the lung tissues, and the direct effect of this excess of silica is to produce an overgrowth of the connective tissue of the organ, and thus impair its function. The condition so established is rarely fatal in itself; the fatality is usually consequent upon an infection of the damaged lungs by the tubercle bacillus. In illustration of the fact that silicosis by itself is not necessarily a fatal disease, I may state that I have recently examined the lungs of a man who worked underground for eight years, when the conditions of labour were very bad, and who, as the microscope showed, developed silicosis during this time. He then quitted his underground occupation and, seven years afterwards, died of the ordinary type of pneumonia to which we are all liable. The infection of the silicotis lung by the tubercle bacillus gives rise to a form of phthisis (miners' phthisis), which differs from the ordinary form of consumption in two important respects. In the first place the tuberculous infection very rarely, if ever, spreads to other organs of the body, and, secondly, the infection is very rarely communicated to other people—unless their lungs also have been previously damaged by silicosis. Pulmonary silicosis is caused by the inhaling of air in which particles of silex are floating, and the forced respiratory movements which occur during severe muscular exertion facilitate the entrance of the dust-laden air into the deeper air passages. All the silica detectable in lung tissue has entered the body with the inspired air; the swallowing of siliceous dust, *i.e.*, taking it into the stomach, is incapable of producing pulmonary silicosis. Although silica is so abundant in the bodies of certain plants, it is not an original component of the bodies of the higher animals. The lungs of an infant do not contain any silica, but as life advances the amount of this extraneous material gradually increases, and by the time adult life has been reached it forms from 10 to 15 per cent. of the ash. In contrast with this figure the analyses of Dr. J. McCrae show that the ash of a miner's phthisis lung yields from 30 to 50 per cent. of silex. Anyone who engages in a dusty occupation is liable to the accumulation of minute particles of foreign matter in the tissues of the lung, and to this condition the generic name of pneumonokoniosis is applied. Special names are given to the condition when it is due to particular varieties of dust: thus particles of iron and iron oxide give rise to siderosis; if the dust be that of coal, the condition is one of anthracosis; clay dust produces aluminosis, and dust which is mainly composed of siliceous particles is responsible for silicosis. It is a noteworthy fact that, contrary to popular belief, most varieties of dust, even of mineral dusts, are not acutely harmful. Careful enquiries have shown that there is no industrial phthisis amongst operatives who habitually inhale the dust from coal, chalk, plaster-of-paris, bricks, tiles, emery, slag-wool, glass, and Portland cement. The dust which, before all others, possesses power for evil is the one to which we have already referred, viz., siliceous dust. It is siliceous dust (the particles being of silica and not silicate) which is responsible for that industrial disease which appears in different industries under such names as grinders' rot, potters' rot, stonemasons' rot, and miners' phthisis. It was formerly thought that needle-grinders and flour-millers developed their phthisis in consequence of inhaling particles of steel and flour respectively; it is now known, however, that the grindstone, and not the material ground, is responsible for the trouble. The old-fashioned grindstone is made of French buhrstone, millstone grit, or other very hard sandstone, and it is the refacing of the grindstone or the running of it in a dry condition which has, in the past, been so prolific a cause of industrial phthisis. Flint is practically pure silica, and it is the use of finely ground flints in the ceramic industries which has been responsible for the phthisis death-rate in the potteries. Granite contains about 30 per cent. of silica, and the harder varieties of sandstone contain much more; it is amongst the men who cut such hard siliceous stone that stonemasons' rot is prevalent. Marble-workers and cutters of limestone do not appear to be materially more liable to phthisis than other people. Quartz is pure silica, and the dust which is primarily responsible for the production of gold miners' phthisis is that which is derived from quartz, and the siliceous rock known as quartzite. An interesting confirmation of the specifically injurious influence of silex dust has been obtained amongst the flint-knappers of Brandon, by Dr. E. L. Collis, H.M. Inspector of Factories. When the surface of a flint is flaked off by a blow a fine smoke of siliceous dust arises, and the worker who is exposed to the repeated inhalation of such dust is unusually liable to develop the form of phthisis known as knappers' rot. Flint-knapping, as Dr. Collis remarks, is probably the oldest of the world's industries; it is an interesting speculation as to the extent to which our troglodyte ancestors suffered from silicotic phthisis. True miners' phthisis is found in Great Britain among the tin miners of Cornwall and the ganister miners of Yorkshire and elsewhere. It is, however, very encouraging to find that the mortality from this cause amongst ganister miners has now almost disappeared, owing to the enforcement of common-sense precautions. Ganister is an extremely hard sandstone, containing from 97 to 98 per cent. of silica. It is ground to powder, mixed with lime water, and compressed into firebricks for lining steel converter-furnaces. The gold-bearing reefs of the Rand are a conglomerate of quartz pebbles in a siliceous matrix. and this conglomerate lies, for the most part, embedded in extensive deposits of quartzite. The gold-bearing conglomerate contains about 86 per cent. of silica, whilst the quartzite, which has to be tunnelled through to reach and expose the reef, contains an even higher proportion. It is the drilling and blasting of such deposits which gives rise to the dangerous siliceous dust. A description of the clinical features of gold miners' phthisis is unnecessary here; from the physiologist's standpoint, however, it is of interest to note that the outstanding feature of the disease is a progressive loss of the normal elasticity of the lung. The normal lung, being elastic, is capable of following the movements of expansion and contraction of the chest walls. The lung of the silicotic patient, on the other hand, is increasingly resistant to inflation by the current of inspired air, and the ultimate result is that as the lung cannot follow the chest wall when this expands, the chest wall becomes more and more fixed in the position of expiration. The most forcible inspiratory efforts eventually fail to elevate the chest wall against the pressure of the atmosphere. A striking and apparently consistent peculiarity of the silicotic lung, as found on the Rand, is the deposit in it of extraneous pigment in conjunction with the extraneous silica; the result of this peculiarity is that the degree to which silicosis has advanced can be roughly estimated by the extent and character of the deposits of pigment in it. The normal lung has but very little extraneous pigment in it; in the early stages of silicosis we find very numerous, small, discrete islands of pigmentation; in the middle stages these islands have become so numerous that many of them coalesce with their neighbours, and thus give rise to a sort of ragged network of pigmentation; in the advanced stage the whole tissue is more or less uniformly pigmented. The onset of infection by the tubercle bacillus, which may occur at any stage of silicosis, is usually indicated by the appearance of small areas of light grey fibrous tissue of very characteristic appearance and structure. As time advances these areas of new, grey tissue are liable to undergo necrosis—that is, local death and disintegration—thus giving rise to cavities or to collections of fluid, which are dark grey or almost black in colour owing to the pigmented particles which have now been liberated from the dead tissue. Silica is a very hard and brittle substance, and when crushed breaks up into a powder of minute angular fragments, many of which are elongated. We are all familiar with the conchoidal fracture of flint, and it is interesting to remark that traces of this characteristic fracture are also to be found in the microscopic fragments which are given off when siliceous rocks are abraded by drilling or shattered by blasting. If we make an ordinary microscopic examination of a section of silicotic lung, we shall find evidence of fibrosis—that is to say, a great increase in the number of connective-tissue cells normally present, and an encroachment by these cells upon the cavities of the air vesicles. We shall also find that the collections of pigmented matter, which are so conspicuous to the unaided eye, have been first laid down around the smaller blood vessels and air tubes. The pigmented matter itself we shall find to consist of carbonaceous particles, many of which, when viewed under higher powers, are found to be contained within the bodies of phagocytic cells. When we come to look for fragments of silica, however, we shall fail to see them, unless we are very experienced, for they are translucent, and do not hold the stain with which the section is coloured. In order to make the siliceous particles visible, we must first polarise the light, and then view our section through an analyser; with the Nicol prisms crossed most of the particles of silex stand out as bright specks and spicules. We shall now be enabled to measure the particles with a micrometer, and to discover the fact that they are of very small size. The peculiar areas of light grey tissue, which usually indicate the onset of tuberculous infection, are found, by microscopic examination, to enclose in their meshes collections of pigment and mineral fragments. The silica among these fragments will not become obvious, of course, until we polarise the light and put on the analyser. It is probable that all the fragments of silex found in the lung tissue have first been taken up within the bodies of living leucocytes and other wandering cells, and then conveyed by these sightless porters along the lymphatic channels of the organ. These wandering cells are unable to transport particles, which are much larger than themselves, and it is this fact which explains and justifies the conclusion that it is only fine siliceous dust which is dangerous to the lungs. We have thus seen that the miners' phthisis of the Rand is due primarily to the breathing of air carrying minute siliceous particles, and secondarily to an infection of the damaged lung by the tubercle bacillus. It is therefore obvious that the suppression of the disease will be obtained by action in two directions—preventing the workers from inhaling the dust, and detecting and excluding from the mines all those who are expectorating the tubercle bacillus. I shall not make more than a brief reference to the principle involved in the various precautions now adopted to prevent the worker from breathing dust. Machine drills, the attendance on which has been such a prolific cause of the disease among hard-rock miners both here and in other countries, are now so constructed that they automatically deliver water along a channel in the drill into the hole which is being excavated; the dust produced by the abrasion of the rock is thus immediately converted into a very thin mud. A further improvement in this type of machine would be a device which could be fixed around its neck to collect the water escaping from the hole, and enable the machine to be used for drilling overhead rock without inconveniencing the worker by the falling mud. Such a device would probably take the form of a deep-guttered tray, or funnel, fitted with a drainage tube to conduct the slime into a bucket or other receptacle. Dryness of the underground workings, paradoxical as it may appear, is inimical to health. Whilst the flinty powder, produced by drilling and blasting, is held in the form of mud or slime, it is innocuous; the danger arises when it is allowed to dry on the hands, clothing, implements, or any other surface which is liable to be disturbed. The past experience of the pottery industry in this matter is very instructive. What appeared to be one of the most potent causes of potters' rot, in the past, was the handling of the dry biscuit ware, from the surface of which a fine siliceous dust was liberated when it was touched with the hands. As the biscuit ware could not, of course, be wetted, this particular source of danger has been removed by the aid of powerful extraction fans. Blasting is an operation which inevitably liberates a large amount of dust, mainly, of course, from the shattered rock, but partly from dust-covered surfaces which have been allowed to become dry, and which are disturbed by the concussion. The amount of dust liberated into the air of the underground workings by blasting is greatly reduced by the use of water-blasts, sprays, atomisers, water-screens, and other devices. Despite all such expedients, however, a fine, impalpable, and often invisible dust hangs in the air for several hours afterwards. The worker can be prevented from inhaling such air either by securing its removal by active ventilation or by forbidding all entrance to the particular working for a sufficient length of time. It is of practical interest to note that even the most efficient respirator yet devised is incapable of arresting the fine, siliceous dust, which is the essential factor in pulmonary silicosis. The other direction in which miners' phthisis is being combated is the detection and exclusion of those workers, who are expectorating the tubercle bacillus, and who are therefore active distributors of infection. Investigations in this matter are being pursued by more than one administration, but I am not free to make any statement, at the present time, concerning certain conclusions which appear imminent. Bearing in mind that pulmonary silicosis has been very prevalent amongst flour-millers and metal-grinders, as well as amongst hard-rock miners, the following facts are of interest. The substitution of steel rollers for grindstones in the milling industry has practically abolished phthisis. Twenty years ago friendly societies would not accept millers as members, but no objection to their membership is now heard of. The steel-grinders of Solingen, during the years 1885-95, died at the rate of 20 per 1,000; precautions were adopted, with the result that, in 1905, the mortality has fallen to 10 per 1,000. Amongst miners engaged in quartz-rock mines we notice that those of the Waihi mines of New Zealand, where precautions against inhaling dust are enforced, are much less affected with pulmonary disease than the workers in less favoured mines of the same country. In the ganister mines of Yorkshire the mortality from phthisis had been "officially" reduced 15 per cent. between the years 1900 and 1912; and upon visiting these mines in September, 1914, I found, to my surprise, that the workers admitted that the disease had been practically abolished from amongst them. Turning now to the Witwatersrand, we find that the President of the Chamber of Mines has recently announced that the applicants for relief under the Miners' Phthisis Compensation Act have decreased 50 per cent. since the promulgation of the measure in 1912. The proposition of abolishing miners' phthisis from the Rand is an entirely feasible one, provided always that the worker and the management co-operate loyally in the common cause. The degenerate and inhuman sentiment revealed in the dictum of "my class, right or wrong," is antagonistic to all communal progress; such an influence can only serve to still further postpone the time, desired of all true scientists, when a man shall be appraised, not by his services to his class, but to humanity.

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*Paper read before the South African Association for the Advancement of Science.

Mashonaland Agency Meeting.

A meeting of the Mashonaland Agency, Ltd., was called for the 3rd inst. to consider the scheme explained in the following circular: "It will be within the recollection of shareholders that the board, for reasons fully explained at the meeting held on the 9th September last, decided to abandon its proposals for the reduction of the capital of the company by the process of reconstruction. It is now proposed, having regard to the depreciation in value of the company's assets, that such assets should be written down to their present value and that the company's capital should be reduced from £400,000 to £150,000, such reduction being effected by: (a) Cancelling lost capital to the extent of £126,342 8s. (b) Distributing in redemption of capital among the holders of the 398,976 shares which have been issued, 132,992 fully-paid shares of 10s. of the Wankie Colliery Company, Ltd., and 6d. per share in cash, equal to £9,974 8s. (c) Reducing the nominal amount of each of the shares, both issued and unissued, in the capital of the Mashonaland Agency, Ltd., from £1 to 7s. 6d. The effect of these proposals will be to leave the company in possession of a number of valuable and diversified assets, of which the majority, and especially the land assets, are still in a half developed condition. The board considers that the cash working capital which will remain in hand after a return to the shareholders of cash to the approximate amount of £10,000 will not be more than adequate for the development of these assets, and for the prosecution of the company's business, bearing in mind the conditions which now prevail."

The Second Pan-American Scientific Congress.

From December 27, 1915, to January 8, 1916, there will meet in Washington, D.C., the Second Pan-American Scientific Congress, in which all of the American republics will participate and for which preparations have been going on for nearly two years. According to the official reports, each of the 21 American republics will appoint delegations composed of its leading educators, economists, engineers, international lawyers, and experts on mining, agriculture, health, transportation and finance. From present indications it is estimated that there will be in attendance over 150 of the most representative men of Central and South America. The first congress was held in Santiago, the capital of Chile, in 1908. That was attended by hundreds of the leading scientists of the Americas, including a large delegation from the United States. When it adjourned, it unanimously agreed to hold the second in Washington. The United States Government has therefore appropriated fifty thousand dollars for the expenses of the conference, and the President of the United States was authorised by Congress to invite all the other American Governments to participate. The authority for the preliminary arrangements was placed in the hands of the Secretary of State.

African and European Investment Co.

Presiding at the annual meeting of the African and European Investment Company on the 23rd ult., Mr. C. F. Rowsell observed that one of the features of the market during the past few months had been a great revival of interest in the Far East Rand. He thought it somewhat surprising, in times such as these, that this interest should have developed to so large an extent, but it was due to the fact that investors and the general public were beginning to realise the enormous importance of the undeveloped gold mining areas on the Far East Rand. This had naturally arisen from the remarkable developments which had taken place on such properties as Springs, Government Areas, Geduld, and generally in the district. The African and European Company is largely interested in this direction, as it has a large shareholding in the East Rand Mining Estates, which practically controls two important areas in the district, and is also interested in the East Rand Extension Gold Mining Company. These interests require a considerable amount of capital for further development, but, in Mr. Rowsell's opinion, the date when it will be possible to raise the necessary means for future development and equipment is rapidly becoming nearer.

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RAND METALLURGICAL PRACTICE.

Discussion of the Paper of F. L. Bosqui, presented at the San Francisco Meeting of the Chemical and Metallurgical Society, September, 1915,

SIDNEY J. JENNINGS, New York, N.Y.—I notice Mr. Bosqui says that zinc dust can be used profitably. I had occasion recently to try to ship some zinc dust to South Africa, owing to the high price of zinc in the last six or eight months and the difficulty in getting zinc sheets. We were informed that the steamship companies in England refused to accept zinc dust for shipment through the tropics on the score that it was an explosive mixture.

C. W. MERRILL, San Francisco, Cal.—In the early days zinc dust was packed in wooded casks. The steamers at that time were very chary of transporting it. It was put on the deck in the wooden casks, and if the zinc dust got wet it exploded. Since that time we have used hermetically sealed cases, in which case there is no risk whatever in its transportation. This rule of the steamship companies is perhaps another sample of their ultra-conservativeness.

HENNEN JENNINGS, Washington, D.C.—Unfortunately, I have not yet read Mr. Bosqui's paper, but believing it might interest you to know something of the beginning of the cyanide process on the Rand, I will speak briefly as to my own knowledge and experience of the early initiation of this process in South Africa. I took the position of consulting engineer of H. Eckstein, the parent firm of H. Eckstein and Co., and a branch of the firm of Wernher, Beit and Co., at Johannesburg, in December, 1889, and at that time the Robinson Company managed by them was the premier company of the fields. Up to this date plate amalgamation and catchment of a small percentage of concentrates by blankets, and in a few instances Frue vanners, were the main gold-saving devices used and had obtained an extraction of only about 65 per cent. of the gold contents of the ore. Also at that time the ore bodies were seen to be changing from oxidized deposits to pyritic at varying depths from 50ft. to 300ft. below the surface, and uneasiness was felt at to future recovery. The deepest exploitation at any of the mines was not much below 300ft. Various treatments of the concentrates had been attempted by the Newbury, Vaughton, Polock and Hungarian process, but with unsatisfactory results. Naturally I turned for further help to the best that had been done in this country in connection with the metallurgy of gold and which, at that time, was the careful concentration by vanners and treatment of concentrates by the Plattner chlorination process. Mr. Butters, at his works at Kenneth, had thoroughly established his ability and reputation in this connection, and he was selected to take charge of the erection of a chlorination plant at the Robinson mine. Mr. Butters arrived about the end of 1890 and started at once on the erection of a thoroughly up-to-date chlorination plant. In the meantime the MacArthur-Forest Cyanide Process syndicate representatives had given public demonstrations of their process at the Salisbury Company's mill in June, 1890. I was privileged to make the first test of this process. Mr. MacArthur and Mr. Forrest were employed by a firm of Scotch capitalists to go through the whole literature of gold extraction and if possible to obtain a practical and efficient commercial method of gold extraction. The result was the MacArthur-Forrest process, one of the few instances of a process made to order. Mr. MacArthur in no way attempted to disguise the fact that the dissolving of gold by cyanide solution and its precipitation on zinc plates was known to chemical students. His claim was that he demonstrated the practicability of using very dilute solutions and their precipitation not on acres of zinc plates but on compact mattresses of zinc shavings. Mr. MacArthur was also fully aware at that time of the factor of fine grinding in obtaining high extraction. The South African rights of the process were in the hands of the Gold Recovery Syndicate of which Cordner James was head. Mr. MacArthur and Alfred James came to South Africa to demonstrate and introduce it, and they were present at the first tests made at the Salisbury Company's plant. The demonstration plant was constructed on the agitation principle and in the test that I followed through, both concentrates and tailings from the Robinson mine were treated. I remained two days and a night at the works. We obtained actual gold buttons which showed about all that was claimed for the extraction and, in fact, the extractions were in accord with the best subsequent practice. No information regarding costs was given, although I afterward learned it was between 20s. and 30s. per ton. As no information of costs was given, the Robinson Company was unwilling to construct the first plant, but gave a liberal contract on a sliding scale for the syndicate to work about 10,000 tons of accumulated tailings, the Robinson Company reserving the right to take over the plant at cost price and continue the working on a royalty basis, with a clause that no better terms were ever to be given other workers. The syndicate constructed the first working plant at the Robinson mines. At this plant, designed by Alfred James, agitators were given up and a system installed of working with square tanks and gravity percolation which contained all the vital principles of the great modern plants that have been improved and developed in details by numerous and various workers. The syndicate put in charge of the Robinson plant George Darling, who was retained for many years as manager of the Robinson cyanide works. At first the cost was as high as 13s. per ton, but it has gradually been reduced to below 2s. In the meantime, Mr. Butters had started the chlorination plant at the Robinson and had done it in such an excellent way and made such a success of the works that he was requested by the Robinson Company, of which I was consulting engineer, to design and erect a new and additional plant for cyaniding at the Robinson, in conjunction with the old one. In this plant he made use of round tanks with bottom discharges, instead of square. The diameter of the tanks, due to my caution, was kept to the maximum of metallurgical practice, which, at that time, was only 23ft. Large cement cyanide tanks, 40ft. diameter, were first made use of at the Langlaagte Estate and Gold Mining Company, Ltd., and were designed by J. R. Williams, who afterwards became the cyanide manager of the Crown Reef Gold Mining Company, of which I was also consulting engineer; at a later date he there developed the first successful treatment of slimes on a large scale by the decantation method. In this field Mr. Butters and Mr. Von Gernet were also effective workers. The Nigel Company, of which I was consulting engineer, was the first (in 1892) to deal successfully with the problem of pyritic tailings. The success of this plant was largely due to my assistant, Fearnside Irving. The direct filling of cyanide vats was first tried in 1893 under my direction at the Salisbury mill, which had square tanks, but the advisability and success of this method was only demonstrated in 1893 and 1894 at the New Heriot mine, with round tanks, at which W. K. Betty was cyanide manager, and was working under my technical direction. The method of filling the vats at the Salisbury and Heriot was by means of hydraulic classifier and hose distribution in connection with slat discharges. Afterward a revolving circular distributing system was invented by Messrs. Butters and Mein and installed at the Robinson Company. Mr. Butters severed his connection with the Robinson Company in 1892 and established a metallurgical company known as the Rand Central Ore Reduction Company. He did most excellent work in connection with this corporation, and among other things gave a thorough trial to the Siemens-Halske electrical precipitation process. Mr. Betty's method of adding acetate of lead in the cyanide treatment made it hard for the Siemens-Halske process to compete with the zinc process. It is needless to go further in the evolution of the cyanide process on the Rand, but without it few of the mines, which are now producing some 40 per cent. of the gold of the world and employing some 200,000 workers, would be in operation.

(To be continued.)

GOLD AND DIAMOND MINING IN THE KLERKSDORP DISTRICT.

Review of the Year.

During 1915, the Machavie G.M. Co. continued its operations. Mr. J. T. Milligan, who had been manager for some months, left the service of the company during the year, and Mr. R. C. Evans is now manager. There has always been a difficulty in treating the ore of the Black Reef with the best results, and this has been the experience of the Machavie, but the company has experimented with a process involving the calcining of the ore and its treatment with cyanide, and these experiments have been very satisfactory. The quality and bulk of the ore body continues to be satisfactory, the reef having been struck in a shaft sunk on the dip at a depth of 188ft. 56½in. wide, of which 44in. averaged 12dwts. The company has constructed a large dam on their water-right. The company does not publish their output, and we are, therefore, unable to give it. The Quest Mine has continued working throughout the year, with profitable results, the monthly profit ranging from £200 to £300. The Afrikander Proprietary is still awaiting the better times which will permit the raising of capital upon reasonable terms and enable work to be resumed. A reconstruction has taken place, which has produced a sum sufficient to discharge all debts and leave in hand a sum sufficient to pay the maintenance expenses of the mine for a time. The Warren Hill Mine has been steadily worked throughout the year, but, as it was known some years ago that the payable ore did not continue beyond a certain depth, the end has been only a matter of time. The exhaustion of the payable ore bodies is now near at hand, and we regret that the operations of this hitherto profitable property will soon cease. The Klerksdorp Estates have resolved upon the demolition and sale of the plant situated upon the southern end of the property, retaining only the ten-stamp mill situated in the northern section. No information is obtainable as to the future policy of the company. The output from the district for the year has been as follows:—

	Ozs.	Value.
January	3,001	£12,752
February	2,537½	10,788
March	2,935¼	12,469
April	2,723	11,569
May	2,965¼	12,596
June	2,859½	12,146
July	2,538½	10,783
August	2,703½	11,538
September	2,512½	10,671
October	2,446	10,930
November	2,529	10,742
†December	2,400	10,200
	32,151	£137.184

†Approximate.

The district's output since 1903 has been as follows:—

	Ozs.	Value.
1903	1,437	£5,748
1904	2,121	8,484
1905	14,146	56,584
1906	11,081	44,324
1907	8,634	34,536
1908	12,559	50,636
1909	17,048	72,485
1910	18,365	78,836
1911	30,745	130,351
1912	31,718	134,743
1913	33,511	142,353
1914	37,377	158,775
1915	32,151	137,184

Diamonds.

The returns of diamonds found in the area which comprises the Klerksdorp Mining District during the year have been as follows:—

	Carats.	Value.		
January	1,065¼	£2,593	5	6
February	1,607¾	4,273	11	6
March	2,006½	6,325	9	6
April	2,595	10,181	1	6
May	2,173	9,389	4	0
June	2,092¾	9,402	13	6
July	2,292	8,984	8	0
August	2,803¾	10,543	19	0
September	3,343½	13,191	5	6
October	3,750¼	14,454	15	6
November	2,918½	13,819	19	6
†December	3,000	14,000	0	0
	29,708¼	£117,159	12	6

†Approximate.

The returns for the previous year showed an almost inverse production, the monthly output having dwindled from a value of £12,348 in January to £2,084 in December. It will be noted that the production has been steadily increasing throughout the year, the result of an improvement in prices. The returns for the preceding four years have been:

	Carats.	Value.
1911	37,861	£198,834
1912	79,709	386,688
1913	81,943	422,616
1914	35,644	141,146
1915	29,708¼	117,159

—From the *Klerksdorp Record.*

Straits and General Development.

The annual meeting of the Straits and General Development Company, Ltd., was held in London in mail week. The report for the year ended June 30 last states that the loss of £26,259 is almost wholly accounted for by the loss sustained in connection with the interest in the Consolidated South Rand Mines Deep, Ltd. The directors of the Benoni Outcrops, Ltd., report that the possibility of formulating any scheme for the development of that company's property has been precluded by the continuance of the war. The auditor reports that in consequence of the war no reliable valuation of the company's investments at June 30 can be made.

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SOME FEATURES OF THE RAND GOLD MINING INDUSTRY.

[By W. A. CALDECOTT. D.Sc.]*

It is now twelve years since the writer submitted to the South African Association for the Advancement of Science a paper entitled, "The Development of Gold Extraction Methods on the Witwatersrand," and twenty-five years since his experience began of life and work on the Rand. During the years that have passed since 1903 the metallurgical progress made has been considerable and continuous, though its rate has varied. This has been in spite of industrial and seditious troubles and the present world-wide war, in which South Africa is involved, but which has not prevented the steady daily production by the mines for shipment to London of £100,000 worth of gold, the material basis of credit. Since 1903 the technical details of much of this progress has been ably reviewed at meetings of this Association by Messrs. J. R. Williams and H. A. White, and more recently by Professor G. H. Stanley. Under these circumstances, the author proposes to include in his review certain general considerations, which are not the less important, because in some cases their influence upon gold extraction is indirect. The tabular statement shows the main results of the operation of the Witwatersrand gold mines during the past twelve years, and is compiled from figures published by the Government Mines Department and Transvaal Chamber of Mines:—

Year.	Tons of ore crushed.	Gold recovered. Ozs. Fine gold.	Gold recovered. Value. £ sterling.	Percentage of world's annual output.	Yield. s. d.	Average per ton 2,000 lbs.). Working cost.* s. d.	Average per ton 2,000 lbs.). Working profit.* s. d.	Dividends (including sundry revenue. Total. £	Dividends (including sundry revenue. Per ton.† s. d.	Average number of workers. White.	Average number of workers. Coloured (Non-European).
1903	6,071.908	2,832,346	12,031,037	17·9	39 8	24 9	14 11	3,334,347	11 0	11,214	58.703
1904	8,022,736	3,638,017	15,453,312	21·6	38 6	24 4	14 2	3,821,847	9 6	13,027	76,557
1905	11,160,422	4,706.433	19,991,658	25·6	35 10	23 6	12 6	4,754,349	8 6	16.227	131,036
1906	13,571,554	5,559,534	23,615,400	28·6	34 6	22 10	12 6	5,565,969	8 2	17,210	136,321
1907	15,523,229	6.220,227	26,421,837	31·1	33 11	20 10	13 3	6,962,420	9 0	16,755	155.214
1908	18,196,589	6.782.538	28,810.393	31·7	31 5	18 0	13 5	8,536,773	9 5	17,593	160,919
1909	20,543,759	7,039,136	29,900,359	32·0	28 11	17 1	11 6	9,310,751	9 1	20,625	168,311
1910	21,432,541	7,228,311	30,703,912	32·8	28 6	17 7	10 6	8,887,185	8 4	23,652	183.592
1911	23,888,258	7,896,802	33,543.479	35·4	27 11	18 0	9 7	7,763,086	6 6	24,708	189,912
1912	25,486,361	8,753,568	37,182,795	38·8	29 0	18 8	10 0	7,960,394	6 3	23,817	192.575
1913	25,628,432	8,430,998	35,812,605	38·3	27 9	17 11	9 6	8,205,199	6 5	23.104	184,266
1914	25,701,954	8,033,570	34,124,434	36·8	26 6	17 1	9 0	8,073,436	6 3	20,971	167,502

*Gold held in reserve, expenditure charged to capital account, interest on and redemption of debentures. and profits tax have not been taken into account in the working costs and profits. For various reasons the working profit shown is not in all cases the exact difference between the yield as shown and the working costs as shown. Thus, while the gold recovered from accumulated slimes is included in the yield, the profit therefrom sometimes appears in sundry revenue instead of in working profit. Again, while the yield is valued at a fixed rate per fine ounce, the rate applicable to the working profit is the actual realisable value of gold, which fluctuates slightly.

†The difference between working profit per ton and dividends per ton is accounted for by the fact that the working profit figure is the gross profit obtained, from which is deducted profits tax, amounts appropriated for capital expenditure, contributions to Miners' Phthisis Compensation Fund, debenture interest and redemption, etc., etc., while certain amounts are always carried forward by the mining companies from one financial year to another.

From that table certain conclusions are apparent: (a) The tonnage of ore crushed has increased fourfold since 1903, and is still increasing. (b) The total mining dividends attained a maximum in 1909, and the gold yield in 1912. (c) The percentage which the Rand gold constitutes of the world's annual output has doubled since 1903, and is now equal to about three-eighths of the total. (d) The yield, cost and profit per ton of ore have all decreased to about two-thirds of the 1903 figures, the present cost being somewhat more than two-thirds, and the profit somewhat less than two-thirds. (e) Working costs per ton of ore were the same in 1914 as in 1909, but the working profit about one-fifth less in 1914. (f) The value of the present average gold yield per worker on the mines is 9s. 11d. per day. Working costs would doubtless be lower now than in 1909 but for heavy increased expenditure due to safety and hygienic measures in various forms, such as dust-allaying and ventilation underground, relief to disabled workers, expenditure due to industrial disturbances, and to the increased cost of mining supplies. As it is, the larger scale of operations and the continual advance in technical details promoting efficiency and economy have only served to offset the additional expenditure due to the causes stated. As regards the cost of supplies, it is considered by one school of economists that the greater the success attained in the exploitation of auriferous ores, the more does the increased production and abundance of gold tend to raise working costs through enhanced prices of mining supplies and commodities generally. Though the average working costs during recent years are over 17s. per ton of ore, yet individual groups have obtained costs of under 14s., and individual mines under 12s. per ton. This to a great extent has been due to the large scale of operations employed in such cases, and to the constant pressure caused by the necessity of profitably handling low-grade ore. If such differences are applied to the total ore tonnage of the Rand, the amount involved is nearly £4,000,000 per annum, and the fact that the foregoing relatively low costs have been achieved is of promise, inasmuch as similar conditions should in time induce a general lowering of costs to conform with lower average ore values, and thus prolong the life of the Rand by bringing within the region of profit much ore which at present cannot be profitably mined. Reviewing generally the position as displayed by the figures in the table in conjunction with the evidence of the Transvaal Chamber of Mines presented to the Economic Commission in 1913, which forecasts the future decline of the gold mining industry of the Witwatersrand, it might be concluded that this industry has attained its zenith, and that whilst possessing the vigour of maturity, it will gradually become a less important factor in South African and the world's affairs than hitherto. But even if this were the case, the experience of California and Australia has shown that the influx of an enterprising population, and the money rendered available by the exploitation of the natural capital wealth of these countries in the shape of gold reefs, has so stimulated permanent agricultural and pastoral production that the annual value of these latter products now far exceeds that of the gold output at any time. The maximum gold production of California for one year was during 1852, and amounted to £17,000,000, whereas the annual value of farm produce at the date of the last Federal census was £27,500,000. The gold output of Australia for 1853 was £12,757,000 (mainly from Victoria), and for 1903 was £16,295,000 (mainly from Western Australia); whereas in 1911 the value of agricultural, pastoral and dairy products was £108,606,000. The present paramount importance of the mining industry to South Africa, and the equal necessity for stimulating permanent agricultural development, are emphasised by the members of the Dominions Royal Commission, who, in their Third Report (p. 11), published in 1914, formulate the following conclusions:—(a) That the purchasing power of South Africa, under existing conditions and pending more complete development of its agricultural resources, is dependent to a peculiar extent on the produce of its mines. (b) That the prosperity, the maintenance and the development on economic lines of the mining industry are therefore not merely matters of importance to the shareholders, or to the population of the mining centres in South Africa, or even to the Government of the Union, but concern the Empire as a whole. (c) That as mines are of the nature of wasting assets, the permanent prosperity of the country also demands urgently the further scientific development of its agricultural wealth. Since the white population of the Rand is about one-sixth of the white population of South Africa, the importance of the mines as employers of labour is very great. Broadly, the mining industry spends yearly seven million pounds for white labour, five millions for coloured labour, and ten millions for supplies. In addition to the above, about three millions are expended yearly on head office costs, mining taxation, claim licences, directors' fees, etc., so that nearly 15s. out of every sovereign's worth of gold extracted is spent locally. The rates of pay on the mines, as compared with other parts of the country or of the world, are high. In the reduction works probably a majority of the workers have been brought up in South Africa, underground a great deal fewer, but all except a very small percentage of the mechanics are from oversea. Various causes have been adduced for this last state of affairs, the chief reason being probably that the demand for skilled workers can be more readily supplied from among imported men than by training apprentices. Efforts are, however, being made to remedy this condition, since the existence of large numbers of an untrained rising white generation in South Africa—unable to compete economically in unskilled labour with coloured workers, or in skilled labour with immigrant artisans, or even with coloured artisans in other parts of the country—is a problem of very serious importance. As in most gold mining communities, the average length of service underground in one mine is short, but in the reduction works this is not the case, and as an illustration of this fact, it may be mentioned that on one group during one year, out of 257 reduction works employees other than learners, there were only fourteen dismissals and twenty-eight resignations, so that the average term of service was over six years. No doubt the desire of the mining companies to retain skilled and reliable workers by considerate treatment, leave allowances, facilities for recreation and other privileges, is largely accountable for this result, but in view of the migratory nature of a mining population, it is somewhat remarkable that such a condition has been attained. So far as ore treatment is concerned, the law precludes anyone from rising to the position of manager of a company who has not been engaged for three years in work underground.

(To be continued.)

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*Paper read before the South African Association for the Advancement of Science.

THE GOLDEN AGE AND THE MINING ENGINEER.

Modern Mining Advancement the Key to Modern Progress.

[By W. L. Saunders.]*

The golden age means more than the age of gold; it is the age of progress, of prosperity and industrial renown and wealth; the age of railways and steamships, of manufacture, of the steam engine, of electricity, of the telephone, telegraph, the automobile and the aeroplane. All these things were made possible, yes, they were initiated and installed through means which were afforded by the mining industry. The mining engineer has multiplied and replenished the earth through subduing it; he has released those forces of nature which have been hidden through countless ages; he has through the science of metallurgy and chemistry made it economically possible to widen and enlarge to enormous proportions the use and influence of these forces. Look into the modern locomotive and steamship and we shall see that almost every pound of their vital structure is a product of the mines: The lathe that fashioned the shaft is itself a product of the mine and it gets its power to turn from coal mined by machines which are themselves products of the mines. Lest you say to all this that the art of mining is as old as the hills let us remind you of the fact that mining at low cost, mining low-grade ore, and doing these things on a large scale and the art of reduction and treatment through metallurgy, are the accomplishments of the mining engineer of our time. This was the key which unlocked those forces which have been the impulse behind the great industrial progress of the world Let us review some of the facts of history. The first half of the nineteenth century was a period marked by little progress in industrial wealth. The world's output of gold from 1800 to 1835 varied from $10,000,000 to $15,000,000 annually. The yearly product of iron during this period was only between 2,000,000 and 3,000,000 tons, coal less than 50,000,000 tons, copper less than 50,000,000 pounds: There were no transcontinental railways, no great steamships, no battleships, no factory system of manufacture, no large corporations. The total gold product of the United States during the period mentioned scarcely reached $1,000,000 annually. Beginning about the middle of the century when California set the pace by adding in a single year $50,000,000, and even $80,000,000 to the gold of the world, there followed a steady and increasing progress made in the output of iron, coal, and copper. Railway building progressed on almost parallel lines, so too did the deposits in the banks of the United States. It is of interest to note here that the American Institute of Mining Engineers got aboard in 1871 and thereafter shared closely in growth and prosperity this march of industrial progress. The world's production of gold at the present time is over $450,000,000 annually. The United States alone now produces over 26,000,000 tons of pig iron annually, and about 550,000,000 tons of coal. The world's yearly production of copper is now over 900,000 tons and of this the United States produced over 500,000 tons. So too we find that the average per capita wealth of the people of the United States has risen from $300 in 1850 to over $1,300. California has added more than $1,600,000,000 to the gold supply of the world. Her record average of over $25,000,000 in gold annually for 50 years is unprecedented. It has been estimated that the actual value of gold deposits should be multiplied eight times to get the true value in credit and capital: If this is true then California has in her gold supply alone contributed over £12,000,000,000 to the capital wealth of the United States. Gold is the standard of all values. It is the measure of credit, the basis of exchange. "Change and decay in all around I see," but in gold there is no change, no decay. The lure of gold has discovered continents and turned deserts into fertile lands. Gold was the beacon light which led Columbus across the Atlantic. Cortez, Pizarro, Balboa, and others who are called explorers were really pioneers and prospectors whose voyages led to the early development of mining in Peru and Chile. But not till California led the way did the mine explorer become a world builder; he was the advance agent of prosperity. The stability of this country in peace and in war is due mainly to the mining engineer. Our industrial strength comes from the mines, the mills, and the furnaces which are now so well organised on a peace basis and which have in their substance all the sinews of war. Military supremacy comes from the same elements as industrial supremacy. It is mainly a question of organising the resources of the country. Of one thing we may feel sure, and that is that no nation can ever make a scrap of paper out of a gold eagle.

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*Extract from Presidential address to A.I.M.E. at the San Francisco Exposition.

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ELECTROLYTIC PRECIPITATION OF GOLD, SILVER, AND COPPER FROM CYANIDE SOLUTIONS.*—III.

[By G. H. Clevenger.]

Virginia City.

In the installation of the electrolytic precipitation plant at Virginia City, Nevada, Chas. Butters & Co., Ltd., had the benefit of the experience gained at the plants previously installed by them. This resulted in several important improvements. Originally there were nine boxes, the idea being to use three of these boxes for precipitating copper from a preliminary wash by sulphurous acid, which, when the plant first began operations, was intended to precede cyanide treatment. The other six boxes were to be used for precipitating gold and silver, together with any copper remaining from the cyanide solutions. The preliminary treatment with sulphurous acid was finally abandoned and direct cyanidation practised. The precipitation practice finally evolved for the cyanide solution was to use four of the boxes in pairs of two arranged tandem, the solution issuing from the first set of boxes passing through the second set. As at San Sebastian, electrolytic precipitation was followed by zinc-shaving. The zinc-box was improvised by placing screens in the bottoms of a number of the compartments of two of the discarded electrolytic-boxes. At Minas Prietas the method of handling the precipitate was rather crude, as a part of the cathodes and anodes had to be removed to give access to the bottom of the boxes during the clean-up. At Virginia City this feature of the process was greatly improved by constructing the precipitating boxes with hopper bottoms. In each compartment where one of the sloping sides of the hopper joined the vertical side of the box was placed a valve through which the bulk of the solution contained in the box could be drawn prior to sluicing out the precipitate. At the apex of the hopper in each compartment was placed another valve through which the slime could be sluiced to a launder that conveyed it to a small concrete tank equipped with a mechanical agitator, whence it was pumped by a centrifugal pump into an ordinary distance-frame and plate type of filter press. After drying the precipitate was sampled and shipped to the Selby Smelting Co. Later, a refinery was built. The precipitate, after retorting to recover mercury, and after the addition of the proper admixture of fluxes, was melted in graphite crucibles heated in specially designed tilting furnaces. With the arrangement described above it was not necessary to disturb the anodes or cathodes when cleaning up. Each box has 12 large compartments, in which were suspended 18 peroxidized sheet-lead anodes ⅛ inch thick, 25 in. wide, and 48 in. long, and 18 tin-plate cathodes of the same size. Sheet aluminum cathodes were also tried. Later, an anode composed of lead rods was used. The advantage of this anode was that it could be made locally from scrap lead or old anodes. The Wood dynamos, each giving 500 amperes at 50 volts, and direct connected to an induction motor, furnished the current. The character of the ore treated at this plant varied greatly. Originally it was built to treat a large accumulation of tailing resulting from the treatment of Comstock ores by pan-amalgamation. Later Comstock ore and concentrator tailing, and ore from the Tonopah district, were treated. The treatment of outside ore began before the exhaustion of the tailing, so that at times there was a varying mixture of tailing and ore. The pan-amalgamation tailing had been re-treated a number of times by the same process and was, therefore, very low grade. It contained copper, mercury, and chlorides as a result of the chemicals added during pan-amalgamation. The tonnage and metal content of the solution varied considerably, but the following is an average of the results obtained over a period when treating pan-amalgamation tailing exclusively, and precipitating 474 to 668 tons of solution daily. There was no distinction made between the solution originating from the sand and slime treatment, the two being combined for precipitation. The average content of the head solution per ton was: gold 0·033 oz., silver 0·78 oz., no record of copper determinations, cyanide 0·046 per cent., protective alkali 6 points. The tail solution from the electrolytic-box contained: gold 0·01 oz., silver 0·22 oz., cyanide 0·066 per cent., protective alkali 4 points. The zinc-box tails contained: gold 0·003 oz., silver 0·03 oz. The current density was 0·245 amp. per sq. ft. of anode surface. The voltage across the anodes and cathodes in each compartment was 3·1. The average content of the head solution when treating a mixture of Tonopah ore and pan-amalgamation tailing was: gold 0·055 oz., silver 3·15 oz., cyanide 0·18 per cent., protective alkali 10 points. The tail solution from the electrolytic boxes, when precipitating 432 tons per 24 hours, contained: gold 0·02 oz., silver 0·60 oz., cyanide 0·18 per cent., protective alkali 10 points. The current density was 0·245 amp. per sq. ft. of anode surface. The voltage across the anodes and cathodes in each compartment was between 3·1 and 3·2.

El Rayo.

The equipment installed at El Rayo, Mexico, followed rather closely the lines of that used at San Sebastian, and consisted of one wooden box 10 ft. wide by 20 ft. long, 4 ft. deep on one side and 5 ft. deep on the other, with the usual arrangement of wide and narrow compartments. In each of the seven compartments were fitted 25 sheet-lead anodes. 20 in. by 40 in. and ⅛ in. thick. Alternating with the sheet-lead anodes, there were 24 sheet-copper cathodes, 20 by 40 in. and 1/32 in. thick. Electrical connection of the anodes and cathodes to the bus-bars was made by means of lead plugs cast on to the plates, to which were soldered copper connecting wires. The current was supplied by a generator giving 500 amperes at 50 volts. At the time that this installation was made, zinc-dust precipitation of the gold and silver was giving satisfactory results. A change in the character of the ore indicated that trouble might arise through a greatly increased proportion of copper. It was, therefore, planned to continue to precipitate with zinc and depend upon electrolytic precipitation to keep the copper in solution down to a concentration that would not interfere with cyanide treatment.

Anodes.

Iron anodes were used with the Siemens-Halske process in South Africa, but lead, with a few exceptions, has been used in American practice. Various other anode materials have been tried, but, everything considered, lead is the most satisfactory. One important advantage that lead has over many other anode materials is that it has a certain salvage value after it has served its useful life as an anode. It has been used both plain and peroxidized, but in general the peroxidized anodes have had the longest life. Many investigators have reported certain anodes as being satisfactory when used in cyanide solutions, but these tests carried on in a small way have always covered entirely too short a period of time. The fact that an anode will stand up for two or three day of continuous operation in no way signifies that it will be satisfactory for a period of operation sufficiently long to make its use commercially economical. Experiments with Acheson graphite have been most disappointing, notwithstanding the favourable reports made by other investigators who have tried this material in a small way for short periods of time. The graphite anodes gradually become mushy and soft and finally are useless. The reason for the failure of the graphite anode is not clear, but at one time I thought that it was due to disintegration of the binding material used in the original carbon plates from which the graphite plates were made. In other words, the graphite resulting from the carbonaceous binding material of the original carbon plate does not appear to form a strong union with that resulting from the carbon proper of the plate. The sheets of lead, after cutting to the desired size, are thoroughly cleaned and in one corner or on the two opposite corners of the short dimension of the sheet is cast a special connecting lug, ½ inch diam. by 4 in. long, by means of a special iron mould that clasps the plate firmly at the point where the lug is to be attached. The lugs are cast from lead to which has been added a small amount of tin, to lower its melting point. The temperature of the lead used in casting the lug should be such that it does not melt through the lead sheet, but still is sufficiently hot to form a thorough union with the lead sheet. A tongued wooden supporting strip is attached to the top of the plate by means of wooden pins. The lead-rods are cast in special iron moulds, observing the usual precautions for preventing the oxidation of lead during melting and the obtaining of a clean, smooth casting free from holes or spongy spots. Twelve of these rods supported in strips of pine drilled to receive them at the bottom, at the centre, and at the top, comprise an anode. The bottom and centre strips are 1·75 by 1·25 in., and are kept from shifting by means of wooden pins that engage the two outside rods. These also serve to prevent short-circuiting of the tin-plate cathodes, which have a strong tendency to buckle. The top strip, 2¾ by 1⅞ in., is counterbored to receive the large ends of the rods, and supports the whole weight of the anode. Electrical connection to the individual rods is made by soldering to them a No. 10 copper wire, which rests in a groove at the top of the strip. The continuation of this wire serves as the means of connecting the anode to the bus-bar. The method of peroxidizing the anodes varied at the different plants. This operation was performed in a separate cell where a few anodes at a time were treated. The first step was to clean and brighten thoroughly the surface of the lead with a scratch-brush. At Minas Prietas a 1 per cent. potassium permanganate solution was used and a current density of 1 amp. per sq. ft. The time was one hour or longer. During the operation the strength of the solution was frequently tested with a standard solution of ferrous sulphate, fresh permanganate being added to keep the solution as near 1 per cent. as possible. At San Sebastian various combinations were tried, but the practice that met with the most favour was to use an electrolyte containing 1 per cent. of potassium permanganate, 2 per cent. sulphuric acid, and a current density of 2½ amp. per sq. ft. The time of treatment was 6 hours. In passing, it is well to mention that it has been found in certain of the electrochemical industries that a denser and more satisfactory coating of the peroxide is formed if the operation is performed in an alkaline solution. At Virginia City the peroxidized lead anodes had a life of about one year. At San Sebastian, on account of the higher current density, the life was 8 to 12 months. At Minas Prietas the life was in some cases considerably over a year.

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* Abstract of paper presented at the twenty-eighth general meeting of the American Electrochemical Society in San Francisco, September 16-18, 1915.

(To be continued.)

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THE NEW COAL-DUST EXPERIMENTS.—III.

Seventh Report of the Explosions in Mines Committee.—Phthisis and Rand Mine Dust.

[By J. S. Haldane, M.D., F.R.S.]

From Table I. it will be seen that the death-rate among miners in the Notts and Derbyshire district is, as compared with the average for English miners, lower from all causes, and indeed, lower than in any except the very healthiest occupations. What is, however, of special interest in connection with the effects of dust is that the mortality from lung diseases is exceptionally low. This point is brought out more clearly by the diagram. In spite, therefore, of the large proportion of shale dust in the air breathed by Notts and Derbyshire miners, their mortality from lung diseases is considerably lower than for coal miners generally, and up to the age of 55 is as low as, or slightly lower than, the exceptionally healthy class of farm labourers. These considerations seem to furnish very conclusive evidence that nothing is to be feared from the substitution for more or less pure coal dust on the roads of a coal mine, of a dust mixture containing 50 per cent, or more of inert dust derived from shale.

Experiments on Animals.

Additional evidence pointing in the same direction has been obtained from experiments on animals. On this subject Professor Beattie has already reported. His experiments showed that when guinea-pigs were exposed for two hours daily for about 12 days to a very dusty atmosphere the effects on the lungs were very slight, whether the dust consisted of coal dust or Altofts shale dust. Large quantities of dust were found in the lungs, but such slight effects as were produced were certainly no greater with the shale dust than with coal dust. On the other hand, when the dust consisted of grindstone dust or powdered flint (dust known from human experience to be dangerous) very marked pathological changes resulted in the lungs after similar exposure. As the Committee wished to have further evidence from animal experiments, a similar series of experiments was carried out in my laboratory by Mr. A. E. Mavrogordato and myself as part of an extensive series of investigations undertaken for the Medical Research Committee under the National Insurance Act. It may be of service if, before referring to the results of these experiments, I endeavour to give a short summary of the light thrown by previous experiments on animals on the results of dust inhalation. Much of the available information is due to Professor Beattie's experiments and to a very thorough experimental investigation of the effects of dust-inhalation, carried out about 30 years ago by Professor Arnold of Heidelberg, who, after several years of investigation, published a book on the subject, his special aim being to trace in detail the paths by which dust enters and leaves the lungs, and the changes produced in the process. Arnold found that if an animal was exposed continuously to a very smoky atmosphere for several weeks the lungs became quite black and highly charged with soot particles, party free and partly taken up in dust cells. A few weeks or months later, however, if the animal meanwhile breathed pure air, the dust had almost completely disappeared from the lungs, except from the lymphatic glands, which remained black. It is clear that the lungs normally possess a great power of getting rid of, at any rate, some sorts of dust, even after it has passed the bronchi and got into the alveoli and actual lung framework. It can be readily understood, however, that this power depends, to a large extent, on the lungs being normal and uninjured. In injured or diseased lungs, on the other hand, dust tends to remain and gradually accumulate, to judge from human observation. It appears from Arnold's and Beattie's experiments that comparatively little real injury to the lungs resulted from inhaling the soft soot particles of smoke, or the particles of shale dust or coal dust. With emery dust, and with dust from the disintegration of the red sandstone used for building purposes round Heidelberg, serious injury to the lungs was prominent, and Beattie found the same for flint dust, emery (alumina), carborundum (carbon silicide), granite dust, and other hard materials. One may conclude with considerable probability from all the experiments that while inhalation in sufficient amount of any kind of dust is prejudicial to the lungs, they are capable of getting rid of lesser amounts without real injury resulting, but that the amount which can be got rid of without harm depends on the nature of the dust, and is far less for such dust as emery, sandstone, or flint, than for others such as soot or coal dust. This hypothesis seems to explain the facts of human experience as regards dust inhalation. It is also in accordance with the fact that Professor Beattie has shown that even coal dust or shale dust will, if inhaled in sufficient amount, produce serious changes in the lungs of animals. Taking together the results of experiments on animals and the facts of human industrial experience with regard to dust inhalation, it appears probable that the damage to the lungs from inhaling certain kinds of dust is sufficient to render the human lung extremely liable to attack by tubercle bacilli, though often insufficient to produce any very evident symptoms by itself. The nature and amount of the damage, if any, due to the dust inhalation alone is evidently dependent on the nature and amount of the dust inhaled, and the duration of the inhalation. A good many facts seem also to indicate that the natural resistance to ill effects from dust inhalation diminishes with age, although in older persons the damage to the lungs shows itself in increased liability to bronchitis rather than to phthisis. The results of our experiments are given in an Appendix by Mr. Mavrogordato. The shale dust used was that employed for stone-dusting at Bentley Colliery, near Doncaster. It is from a shale adjacent to the Barnsley seam, worked at the colliery. This shale was selected as being free from gritty material and oil. It is ground up in a mortar mill and applied freely to all the roads requiring it in the mine, just as at Altofts. The dust used was passed through a 90-mesh sieve and thoroughly dried before use, so that a thick dusty atmosphere might be produced. Our experiments gave results similar to those of Professor Beattie. If anything, the shale dust seemed to produce less effect than a similar exposure to coal dust. Plenty of very fine dust could be seen in sections of the lungs at the end of a fortnight's exposure for two hours daily to the dust; but no marked pathological changes could be detected, and in animals kept after the exposure, the dust in the lungs diminished gradually, so that after six weeks only a few dust-containing cells were visible, and there was no change which, so far as we could judge, could have any appreciable effect on the functional activity of the lungs. The shale dust seemed to disappear somewhat more rapidly than the coal dust.

Flue Dust.

Besides shale dust, flue dust from the furnaces of the surface engines at collieries has recently been employed somewhat extensively for stone-dusting, and the experiments at Eskmeals have shown that this material is very effective in rendering coal dust inexplosive. From such enquiries as I have been able to make in connection with collieries where flue dust is used for stone-dusting it would seem that no complaints have, as a rule, been made by men exposed to inhalation of air containing flue dust. On the other hand, Mr. A. M. Henshaw, of Talk o' th' Hill Colliery, informed me that he received such serious complaints from men employed on roads stone-dusted with flue dust that he had given up its use in favour of shale dust.

(To be continued.)

The best "Reef Traveller" is the *South African Mining Journal.*

Rhodesian Section.

LATEST RHODESIAN MINING NEWS.

Lonely Output—Rezende Mines—Bulawayo Syndicate—Bechuanaland Trading—Kimberley (Mashonaland) Gold—Bwana M'Kubwa—Rhodesia Native Labour Bureau and Small Workers— Enterprise Gold—Rhodesia Broken Hill. —Pickstone Gold

The output of gold from the Lonely Mine for the month of December was as follows: Mill ran, 649 hours; crushed, 3,760 tons; yield of fine gold, 639·542 ozs.; value, £2,688 2s. 6d.; slimes treated, 3,760 tons; yield of fine gold, 1,775·909 ozs.; value, £7,467 7s. 6d.; total recovery of fine gold, 2,415·451 ozs.; total value, £10,155 10s.; estimated profit, £1,955.

* * * *

The results for the month of December at the Rezende Mines are as follows: Central Section, estimated profit, £551; Old West Section, estimated profit, £302; total estimated profit, £853.

* * * *

The ordinary general meeting of the Bulawayo Syndicate, Ltd., was held in London in mail week. Mr. A. R. Stephenson presided, and, in moving the adoption of the report for the year ended October 31 last, observed that the net surplus for the year was £2,450. Adding £377 brought forward, they had at the credit of profit and loss account £2,828. In view of the further depreciation on investments, it was necessary to transfer a further £2,500 to reserve for depreciation and investments, bringing the amount up to £5,000, and leaving to be carried forward a balance of £328. The report was adopted.

* * * *

The annual meeting of the Bechuanaland Trading Association, Ltd., was held in London in mail week. Mr. T. J. Seel presided, and, in moving the adoption of the report, observed that during the period under review the Association had been faced with unparalleled difficulties. The difficulty of securing goods, the very high prices which had to be paid for the majority of the articles in which the Association dealt, and the severe drought in the first part of the year, all materially affected the volume of business done and the profit earned. The loss on the year's working was but small. The report was adopted.

* * * *

From the standpoint of development the Kimberley (Mashonaland) Company was unfortunate during the twelve months to May 31 last. Below the 5th level nothing of importance was discovered, and work on adjoining claims was likewise non-productive. In the mine itself apparently £17,139 was expended, equal to 6s. 1d. per ton milled, and on the claims under option £2,602. The existing ore reserves are estimated to last at the present rate of crushing for something like two years. The ore treated since the close of the financial year has not yielded such good results. In order to pay the two interim dividends of 3 per cent. and the directors' extra remuneration, together amounting to about £19,800, the working profit of £5,947 had to be reinforced by the £14,615 brought in, so that there is something like £763 to be carried forward.

* * * *

Mr. G. Upton addressed the last meeting of the Rhodesia Small Workers' Association. Since he addressed them last year, he said, twenty-five small workers had become members of the Bureau and had taken labour from it; several farmers had likewise joined and the large mines had arranged to take 20 per cent. of their required labour from the Bureau. As a result of this support the capitation fees had been reduced still further. At the outset the fee was £5 per head, and the first lowering was to £3 10s., then £3, and now to £2 15s.—a reduction of approximately 50 per cent. within eighteen months. The current calendar year was likely to be a critical one for many people—certainly for the Bureau—and he asked that all possible support be accorded this labour organisation. Those people who asserted their ability to obtain free labour should have their attention drawn to the fact that, but for the past work of the Bureau, no such free labour would be available. In expressing his thanks to the Small Workers' Association for their support in the past, he solicited their continued assistance in his endeavour to create the cheapest labour supply in the world. In the course of his comments, Mr. Mack expressed the opinion that there were many men who did not rightly understand how to join the Bureau or exactly what joining involved. Mr. Upton, in replying, promised to circulate a memorandum giving simple details of the mode of procedure. He asserted that with more pronounced support the terms could be made so attractive that it would not be to the employers' interests to seek other sources for securing a labour supply. The Chairman thought the Bureau might rely on the support of the small worker.

* * * *

The report of the Bwana M'Kubwa Copper Mining Co., Ltd., for the year ended 30th June, 1915, states that the call on 63,173 shares at par to 31st December, 1914, as per last balance sheet, was not exercised and was not renewed. The financial position at 30th June, 1915, was as follows: Cash and War Loan, £46,269; debtors, £9,993; estimated value of concentrates unrealised, £7,750; together, £64,012. Less creditors, £3,793; leaving £60,219. In the directors' report for the year to 30th June, 1914, it was stated that certain rights had been exercised and that a farm of 6,000 acres had been pegged near Kafue railway station. It has since been found that native locations and other difficulties would prevent the company obtaining a full block of 6,000 acres in that locality. The area referred to has therefore been abandoned, with a view to locating elsewhere a farm of 6,000 acres in one block. Operations at the mine were suspended on 10th September, 1914. Arrangements were then made and are still in force for the caretaking of the properties and the maintenance of plant and works. The manager reports that at the time of closing down all underground faces showed satisfactory values and offered good prospects for the development of further quantities of high-grade ore. He also reports that everything has been maintained in good order to admit of a resumption of work when such may be found advisable. From 1st July to 10th September, 1914, 459 tons concentrates containing 204 tons copper were produced. The concentrates in stock at the mine at the date of last report have since been shipped and sold. The operations in London for the demonstration by an American company of a process for the treatment of the low-grade ores, as referred to in the last report, have been completed. The results

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obtained were, in the opinion of the company's technical advisers, sufficiently favourable to show that a satisfactory extraction of the copper could be obtained. Arrangements have therefore been made with the American owners of the process for the preparation by them of plans, specifications and estimates for a plant to treat 100 tons of ore per day and capable of extension up to 500 tons per day. It is expected that these plans and specifications will be completed early in January.

* * * *

The accounts of the Enterprise for the year to June 30 show a profit of £96, and, with the sum brought in, the total is £175. Owing to market conditions and the impossibility of obtaining reliable quotations for the company's share interests, the usual note dealing with the item share interests on the balance sheet has been omitted—all share interests have, however, been taken in at cost or under. The reserve account stands at £25,000. No work has been undertaken on the company's claims during the year.

* * * *

The report of the Rhodesia Broken Hill Development Company, with accounts, to August 31 states that during the year work has been chiefly directed to mining ore from and investigation of No. 1 kopje, and the consulting engineer's report that there are available 55,000 tons of ore, assaying approximately 38 per cent. lead and 18 per cent. zinc, suitable for direct smelting. Considerable deposits of ironstone and limestone of a suitable character for fluxes have been discovered. War conditions have ruled during the whole of the period, and construction work, which consisted in the erection of a concentration plant and a smaller smelter, was much delayed. Essential parts of the smelter, through non-delivery, have had to be replaced. Difficulties in obtaining freight for oil and other materials prevented the starting of the concentration tests at the date anticipated. All construction work, with the exception of the erection of the bag-house for the recovery of zinc fumes, was finally completed in September last. The smelter was blown in on June 14, and since that date has run intermittently. Mechanical and other difficulties presented themselves, and the board consequently invited Mr. S. J. Speak (of Messrs. Hooper, Speak & Co., consulting engineers) to visit the mine and investigate the conditions and personally superintend the experiments. Mr. Speak sailed for South Africa on September 4, is now due to arrive in London, and the directors hope he will be able to place his views and recommendations before shareholders at the annual meeting. The output of lead to the end of November amounted to 354 tons. The metal produced is of a good quality and finds a ready market at current prices. In consequence of the various delays and disappointments the funds provided for carrying on operations were found to be insufficient. It was stated at the last annual meeting that arrangements had been made for a minimum loan of £10,000. Having regard to the views of the company's consulting engineers on the probable success of the process, arrangements have been made to further increase the loan by £16,000, making £26,000, of which £16,000 had been advanced to the company up to the date of the accounts. The London expenses have been further reduced, the directors' undrawn fees have been waived; it is also expected that if operations at the mine continue the cost of production will be lowered. The company has received assistance from the Rhodesia Railways by a substantial reduction of railway rates on the lead carried. Owing to the inland situation of the property, the possibility of continuing operations depends to a great extent upon the support of the administration of the country and the railway management.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

The third annual general meeting of the Pickstone Gold Mines, Ltd., was held at the offices of the company, Duchess Hill, Hartley, on the 20th December, 1915, Mr. W. McD. Stokes presiding. In the course of his speech the Chairman said the authorised capital had been increased to £150,000 and the issued capital to £63,150 15s. This course had been taken to provide for the issue of 104,750 shares to the shareholders in the Glenrosa Mines, Ltd., in terms of the agreement of amalgamation. The unissued reserve stood at £86,849. The amount against creditors included the £3,000 due to the liquidator of the Glenrosa Mines. This amount was the balance of the sum of £12,000 advanced by the Glenrosa Company to the Pickstone prior to amalgamation, and which it was agreed should be refunded. It became due on the 23rd inst. and the necessary funds to meet the payment were in hand. The reserve account had been increased to £6,574. The profit and loss account for the year under review showed that the Pickstone Mine made a loss of £13,209. On the other hand the Glencairn Mine from February 1 to July 31, 1915, made a profit of £18,271 15s. 9d. The word loss was not quite applicable in connection with the Pickstone operations as a considerable portion of the amount represented development, metallurgical experiments, etc. Ore reserves at the Pickstone were estimated at 23,741 tons of an average milling value of 24s. 6d. per ton, exclusive of slimes awaiting treatment. Regarding the Glencairn, development was now being pushed forward from the fifth level downward. A report on the property had just been made by Mr. W. F. Dudgeon, A.R.S.M., and his recommendations were being acted upon. Working costs had been reduced and would be still further reduced. The ore reserves had been calculated at 5,225 tons, averaging 20·66 dwts.—approximately £22,000. All available energy was now being directed towards the finding of another of the rich pockets for which the mine was noted, and until that object was attained, he, the Chairman, strongly urged the adoption of Mr. Dudgeon's recommendation that the monthly output be restricted to about £2,000. Another important point raised in Mr. Dudgeon's report is that current and accumulated tailings from the mill plates are of such a value as to constitute an important source of revenue. The re-starting of the cyanide plant would receive early attention. The adoption of the report of the directors and statement of accounts was unanimously carried. With the election of directors and auditors, the proceedings terminated.

PERSONAL.

A South African Red Cross class is starting on the Ginsberg Mine early next week, the secretary being A. Gidley-Moore.

* * * *

After a long and heated discussion the Austrian Society of Engineers and Architects has expunged the name of Sir William Ramsay from the list of its corresponding members.

* * * *

The sudden death occurred in London in mail week of Mr. J. W. Broomhead, the well-known mining writer. Mr. Broomhead had been in poor health for months past, and had not been seen very often in the City since the outbreak of war. He was a director of the Tanganyika Concessions, the Zambesia Exploring, the Waihi Grand Junction Gold Mining and several other companies.

Sakalava Madagascar Proprietary Oil Fields.

The secretary writes:—"We have received the following cable message from our field manager, Mr. G. M. Robinson, viz.:—Number 3 well 2,400 feet deep, formation blue shale."

The *Financial News* says that although the diamond trade is likely to remain far from normal for a considerable time, the undertone is good, and if the supply is regulated to the demand the market can be resuscitated more quickly than the public imagine.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Mines Replenishing Stocks—High Prices of Material, Chiefly Through High Freights White Lead Establishes a Record of 60s.—Many Enquiries from Natal and Transvaal Coal Mines.

Within the past week, a fair amount of activity has been enthused into the Commercial Exchange on account of the renewed buying of the Mines. It appears that now the year end stock-taking is over the mines have decided to replenish up to five months' supplies for ordinary "bread and butter" lines, and twelve months or thereabouts for chemicals. Up to the present the principal purchasing has been for machinery spares and other parts always getting depleted by constant wear and tear. Another feature of the week has been the number of private cables received by the various merchants, stating that great advances have taken place in the price of all steel and iron goods. Hitherto we have been talking rather flippantly about values advancing, scarcely believing that the time would come when the fact would become a reality, which it has to-day, as we seem to be in the thick of it. It is not only the high prices, but the uncertainty of getting any particular line out on a given date, as, for example, an indent was sent Home nine months ago for air-cocks, and the first consignment has only put in an appearance this week. The second-hand dealers are kept well employed, in searching for the things in demand, rather than actual business, as small battery spares, crusher parts, rails, piping, and such like goods are scarce, therefore very difficult to obtain, as it appears that things in every day use are wearing out, and others are not obtainable from the usual sources. Take for example second-hand timber: a broker had a decent order for ordinary sizes, but he could not obtain them from any one yard, and by picking them up here and there, such a collection would be a very odd looking lot, and anything but uniform; therefore, resource had to be made to new stuff, and, after all, the cost was not so much more than the miscellaneous collection, and obviously would give better satisfaction.

It would appear from a Reuter's cable, that the mild sensation causing the mines to purchase more freely, can be attributed to the demand for cargo space generally, and the freight question is becoming a more gigantic problem every day owing to the ever-increasing demands of the world war on shipping. High-class liners are particularly hit, as they are demanded by the Admiralty and receive Government rates, whereas tramp steamers are mostly exempt and obtain their own terms, which are often five or six times over pre-war rates. Hence, it is said that owners of tramp steamers, and even sailing vessels, are making big fortunes.

Iron, Steel and Hardware Goods.

Stocks are getting lower generally, owing to a decided check in arrivals, chiefly due to the fact that the British Government have further commandeered ships for supplying troops and supplies to the Balkan and Mediterranean war areas. There is still an acute shortage of 4lb. drill hammers, and much booking to arrive is being adopted, without recurrence. All steels, especially the best kinds, have risen in price; drill steel is up ½d. per lb., and tool steel from ½d. to 2d.; also mild, ¼d. per lb.; which, in a way, are serious items on big orders, as well as illustrating the fact that steel is so difficult to obtain, and stocks in our merchants' hands are anything but plentiful. As previously mentioned in these notes, it was forecast that as soon as the mines made a move to replenish stocks the weak points would quickly be disclosed and, roughly speaking, the weak points are a lowering of those stocks which are in heavy wear, both day and night, and their replacement is beginning to tell. However, there is nothing yet to be disturbed about, as it is simply a matter of paying more for all the material in active and constant use.

Timber, Bricks and Building Material.

There is another advance quoted for deals in long lengths, having risen another ½d. per foot, making them 11¼d., which is getting unpleasantly close to the 1s. per foot so often talked about, also pitch pine has gone up 3d., viz., 5s. 7d. to 5s. 10d. per cube. This is entirely owing to the increased demand from the mines, as the trade with building contractors is exceedingly slow since the middle of December last. Oregon timber remains the same, which can only be accounted for to the decided preference given to the Baltic description which is much more easily worked, as the Oregon gives off so many splinters, being of a brittle nature, therefore, unpleasant to handle in the underground subdued light. Flooring is up ¼d. per foot, which is a sign of the times that all timber is on the ascendant to a higher level of prices, chiefly through the ever-increasing freights and the erratic shipping facilities. There is not a bad demand for bricks, and transport is fairly abundant, as the rains have enabled the veld-feed to grow for the trek oxen; therefore, the price for cartage is about 2s. 6d. per thousand, less than in the middle of December. Builders' hardware is slow; but all enamel bath and sanitary ware is not easy to get even at the higher prices simply because of the difficulty of obtaining such goods from Oversea.

Chemicals and Electrical Goods.

The chemical business continues quite good with the demand from the mines, base hospitals and Government requirements for the military. Permanganate has risen to 7s. 6d. per lb., and can only be obtained in small quantities at the retail chemists. Alum also has risen double, up to 9d. lb., and even at that no great quantities are available. However, taking the chemical supplies on the whole, they keep up wonderfully well, and, with few exceptions, no acute shortage is anticipated. Formaldehyde is now 17s. 6d. per gallon, through shortage, as compared with 9s. at the pre-war period.

The electrical trade is dull and uninteresting, as people seem determined to hang up all repairs, and to a certain extent new work, until things get cheaper or improve. Rubber flex is very scarce and it is estimated that there is not more than ten gross in Johannesburg. All the various stocks are gradually being absorbed, and others are not expected to arrive until the beginning of February. The mines are buying as much as usual, but contractors' orders are about half what they were three months ago.

Oils, Paints, Leads and Brushware.

Country trade is again picking up, but town is slack. New wallpapers for 1916 are expected here on February 2nd. Although the latest cables show a slight decrease in the ordinary lead, yet white lead is dearer, and the best cannot be had under the unprecedented price of 60s. per

MINING EXAMINATIONS.

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WRIGHT'S ROPES.

100lb. in Johannesburg. Whilst linseed oil is stationary, yet linseed oil putty has advanced 6d. per bladder and 1s. 6d. per cask of 100lb. Brushware is coming forward quite freely and top prices seem to have been reached, as the latest cables state that long bristles are cheaper. The information is meagre, but dealers take this to be an indicator that brushware may remain stationary at these high level of values, and eventually ease off a little as more supplies come forward, presumably on account of some of the raw material becoming more plentiful.

Second-Hand Machinery and Materials.

There are a number of enquiries from the Natal and Transvaal Coal Mines, as it appears a lot of activity prevails in development and new works with the idea of increasing outputs to supply shipping at the coast with coals on their way, via the Cape instead of through the Suez Canal. So far a few engines, boilers and pumps have been sold, but as the coal industry develops much more is expected for general supplies to be requisitioned from Johannesburg from the large stocks of varied goods required in running mines of every description. The ordinary feature of the second-hand trade is pretty much restricted to agricultural supplies, in the way of pipes, pumps and small power engines, either steam or motor. According to the last auction sales, the price of farms has had a slight turn for the better, since the slump when the Land Bank stopped advancing.

Revised Price List.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 17s. 6d., 19s. 6d. and 22s. 6d. (local do., 14s. 6d. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 3d. lb.; drill, 5¼d. lb., tool, 7½d. to 9d. lb.; steel plates, 10ft. x 4ft. x 1-16in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 45s.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 37s. 6d.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, ¾ in. and under, 25s., and above that size, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £15½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8½d., 11 ft. 9d., 12 ft. 9½d.; 26 gauge, 6 ft. to 10 ft., all lengths about 8d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 31s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9x3, up to 16ft., 9½d.; over, 9¾d. to 11¼d. (Oregon, 10⅛d.); flooring, 4½x⅞ and 6x⅞, 4⅝d. to 4¾d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4½d.; pitch pine, 5s. 7d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 6d. per cub. ft.; do., large, 15s. 6d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport still scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000: reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 25s., boiled, 25s. per 5 galls.; white lead, 58s. to 60s. per 100 lbs.; turps., 50s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 17s. 6d. to 21s.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 4s. per 12½ lb. bladders, 25s. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s.; paraffin, 13s., 2/5; petrol, 22s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 7s. 6d. lb.; alum, 9d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay), 57s. 6d., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 15s. 6d. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yard; 3/20 coils of wire, 25s.; do., 3/22, 21s.; tubing, 12s. to 13s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 3s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.: do., bobbins. 10s. to 15s. 100; cleats, 15s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Companhia do Nyassa.

The report for 1914 of the Companhia do Nyassa states the ravages of the cyclone destroyed or damaged not only the buildings of the company in Porto Amelia, but much valuable material. Owing to the same abnormal causes which occurred last year, and continue during the present, the directors have not yet given effect to the decision of the extraordinary general meeting held on December 8, 1913, in view of the fact that the position arising out of these causes will require other steps of a financial character to be taken which the administration of the company is now studying.

Mozambique Macequece.

The annual meeting of Mozambique Macequece, Ltd., was held in London on December 15. The report for 1914 states that in the hope of being able to obtain another tributing contract, or to effect a sale of the property, the directors thought it desirable to keep the mine partially unwatered for inspection. A proposition of that kind has been made to the directors, but the negotiations have been somewhat protracted, and no agreement has yet been signed. The directors expect, however, to hear soon that this has been effected.

Sakalava Madagascar Proprietary Oil Fields, Limited.

(REGISTERED ORANGE FREE STATE.)

Shareholders in the above Company are reminded of the Extraordinary General Meeting to be held at the Grand National Hotel, on SATURDAY, THE 22ND OF JANUARY, 1916, at 8 p.m.

The business to be brought forward at this Meeting is of a most important nature, and it is to be hoped as many Shareholders as possible will attend.

By Order of the Board,
G. W. HERALD,
Secretary.

71 Standard Theatre Buildings,
Joubert Street, Johannesburg.

THE WEEK IN THE SHAREMARKET.

Firm with Less Activity—Steady Demand for Dividend Payers and Far Easterns.

PRICES have reacted slightly during the week, though the tone remains satisfactory. The volume of business likewise has fallen off, and there has been somewhat less demand for Far East Rand shares. Of course, this was but to be expected after the activity of the previous week, and is an entirely healthy sign. The delaying of the New Modder splitting scheme frightened some nervous people, and gave rise to several incorrect rumours. There is no reason to fear that the Daggafontein scheme is similarly likely to be held up, as the cases are not parallel. Diamond are a trifle firmer on the prospects of a big amalgamation of producers. Tins are still quiet; and interest remains centred in Far East Rand shares and one or two other promising specialities.

	Fri., 14th.	Sat., 15th.	Mon., 17th.	Tues. 18th.	Wed., 19th.	Thurs., 20th.
African Farms	8 6*	8 10	8 9	8 7*	8 9	8 6*
Apex Mines	5 0*	5 0*	5 0*	5 6	—	5 4*
Aurora Wests	8 6*	9 0*	9 0*	9 0*	9 0*	8 6*
Bantjes Cons.	8 0*	8 0*	8 0	8 3†	8 3†	8 3†
Brakpan Mines.	69 0*	68 0*	68 0*	66 3*	67 6*	67 6*
Breyten Collieries	21 0*	21 0*	—	20 0*	20 0*	20 0*
Brick and Potteries	—	5 0*	5 0*	5 0*	5 3*	—
Bushveld Tins	—	0 3	—	0 3*	0 3*	0 3
Cassel Coals	19 6†	19 6†	—	19 6†	—	—
City and Suburban	36 3	36 0	36 0	35 6*	35 6*	—
City Deeps	75 0	75 0	75 6*	74 6	74 3*	74 0
Cloverfield Mines	8 6	8 8	8 10	8 4	8 4	8 0
Clydesdale Collieries	—	13 0*	13 0*	13 0*	13 0*	13 0*
Concrete Construction	1 9†	1 9†	—	1 9†	—	1 9†
Cons. Investment	—	—	—	—	15 0*	—
Cons. Langlaagtes	34 0*	35 0†	—	—	—	—
Cons. Main Reefs	18 3	18 0*	18 0*	18 0*	18 0*	18 0*
Cons. Mines Selection	—	—	14 0*	14 0*	14 0*	14 0*
Crown Diamonds	2 9†	2 9†	2 0*	2 0*	2 9†	2 6†
Crown Mines	61 0*	65 0†	—	—	—	—
Durban Roodepoorts	—	—	7 0*	—	—	—
Durban Rood. Deeps	—	—	12 0*	—	—	—
East Rand Centrals	4 4	4 4	4 0	4 0	3 10*	3 10
East Rand Coals	2 3*	2 3*	2 4	2 7*	2 8*	2 7*
East Rand Deeps	1 8*	2 0	1 10*	1 9†	1 6	1 7*
East Rand Mining Estates	10 0*	—	—	10 3	10 0	—
East Rand Props.	19 3*	19 9	19 6*	19 0*	19 0*	19 0*
East Rand Debentures	£77½*	—	£77½*	£77½*	£77½*	£77½*
Eastern Gold Mines	1 4*	1 6	1 9*	1 7	1 7	1 6*
Ferreira Deeps	—	—	—	—	40 0†	—
Frank Smith Diamonds	1 10*	2 0	2 1	2 2*	2 0*	2 6†
Geduld Props.	38 3*	38 0	38 0	37 6	37 6	37 3
Glencairns	—	—	—	1 0*	—	—
Glynn's Lydenburgs	8 0*	8 0*	—	9 6*	9 6*	8 6*
Goerz & Co.	12 0*	—	—	—	—	—
Government Areas	33 3	32 3	32 3	31 3	31 3	31 0
Jupiters	7 9	7 3*	7 3*	7 3*	7 0*	7 0*
Kleinfontein Estates	—	—	—	—	—	1 6*
Klerksdorp Props.	—	—	—	1 6	1 6*	—
Knight Centrals	11 0	10 0*	10 11	11 6*	11 4	11 3
Knights Deeps	23 0†	—	23 0†	21 0*	—	—
Lace Props.	5 6†	5 1	5 0*	5 5	5 4	5 4
Luipaardsvlei Estates	5 3*	6 6*	6 3*	—	7 0*	7 0*
Lydenburg Farms	7 3	7 0*	7 1	—	6 9	6 6
Main Reef Wests	6 6	6 7*	6 9	6 6*	6 10*	7 0
Meyer and Charltons	98 3*	98 0*	97 6*	97 6*	97 6*	—
Middelvlei Estates	1 3*	1 3*	—	—	1 3	1 3*
Modderfontein B.	115 6*	116 0	115 0*	115 0*	116 6	115 0*
Modder Deep Levels	112 6*	113 6	112 0*	111 0*	112 0	111 6*
New Boksburgs	1 9	1 6*	—	1 9	1 9	1 9
New Eland Diamonds	11 6*	11 6*	—	15 0†	—	—
New Era Cons.	7 6	7 3*	7 6*	7 9	7 4*	7 3
New Geduld Deeps	3 11	3 11	3 9*	3 9	3 7	3 7*
New Gochs	—	—	—	14 0	—	14 0†
New Heriots	—	—	—	50 0	—	—
New Kleinfonteins	30 6	30 3*	30 6	30 0	30 0	29 6
New Modderfonteins	—	—	—	—	320 0†	315 0†
New Rietfonteins	—	—	—	0 3*	—	—
New Unifieds	—	11 0*	11 0*	—	—	—
Nigels	—	—	6 6†	—	—	—
Nourse Mines	—	—	—	18 0†	—	17 0†
Pretoria Cements	45 0*	45 0*	46 0	45 6*	45 6*	46 6*
Princess Estates	3 6*	3 6*	3 6*	3 6*	3 6*	3 9†
Rand Collieries	4 3†	4 3†	3 3*	—	—	3 3*
Rand Klips	6 8	6 6	6 8	6 4	6 3	6 3
Rand Nucleus	1 11	2 3	2 3	2 5	2 9	2 4*
Randfontein Deeps	3 3	3 1*	3 1*	3 3	3 1*	3 1*
Randfontein Estates	12 6†	—	12 0†	12 6†	—	—
Roberts Victors	9 0*	10 0*	—	12 0*	12 0A	12 0A
Rooiberg Minerals	13 6	13 0*	13 9†	12 6*	12 6*	12 6*
Roodepoort Uniteds	6 9	6 9*	—	6 9	6 9	6 6*
Ryan Nigels	—	—	2 0*	2 0*	2 0*	2 0*
Shebas	2 0†	2 0†	1 0	1 0*	1 0*	1 6*
Simmer Deeps	1 10*	1 10*	2 0	2 1*	2 0*	2 0*
S.A. Lands	4 0	3 10*	4 1	4 3	4 2	3 11*
Springs Mines	43 3	42 9	42 6	41 9*	41 9	40 6
Swaziland Tins	—	—	21 0*	—	—	—
Transvaal Coal Trust	52 0†	51 6	50 0*	50 0*	50 6*	49 3*
Transvaal Lands	12 0†	—	12 0†	10 0*	11 0*	11 0*
Transvaal G.M. Estates	—	26 9	26 0	25 6*	25 6*	25 6*
Tudors	—	2 0†	—	—	—	—
Van Dyks	—	3 9*	3 9*	3 9*	—	3 6*
Van Ryn Deeps	60 6	59 6	—	59 3*	60 3	59 6
Village Deeps	33 6	32 6*	33 6	33 6	—	—
Village Main Reefs	20 0†	—	—	—	—	
Vogelstruis Cons. Deeps	1 5*	1 6	1 6*	1 6*	1 7	1 [illegible]
Welgedachts	—	—	15 0*	—	15 0*	15 0*
West Rand Cons.	—	—	—	—	—	8 0*
Western Rand Estates	1 0*	—	—	—	—	—
Witwatersrands	52 0	50 6*	50 6*	51 0*	51 6*	52 6*
Witwatersrand Deeps	22 3	—	—	22 0	22 0	22 [illegible]
Wolhuters	9 6*	9 6*	9 9	9 9*	9 [illegible]	[illegible]
Zaaiplaats Tins	9 0*	9 6	9 9	9 9*	10 [illegible]	[illegible]
Union S.A. 4 per cent.	£99 3 9†	—	—	—	—	
Union S.A. 3¾ per cent.	£96¾*	—	—	—	—	—

* Buyers. † Sellers. A Odd lots.

Benoni Consolidated Gold Mines.

The London agent of the liquidators informs holders who have not yet surrendered the shares for which they are registered in Benoni Consolidated Gold Mines (in liquidation) for conversion to the relative shares in the New Kleinfontein Company that if the shares are not claimed it is the intention of the liquidators to apply to the court in due course to sell the New Kleinfontein shares and hand over the proceeds to the Master of the Transvaal Supreme Court.

Pittsburgh Steel Company
Pittsburgh, Pennsylvania
U. S. A.

MANUFACTURERS OF
OPEN HEARTH
STEEL PRODUCTS

Wire Rods, Galvanized Wire, Bright and Annealed Wire, Varnished Wire, Galvanized Barbed Wire, Nail, Bolt and Rivet Wire, Wire Nails, Fence Staples, Fabricated Stock, Poultry and Lawn Fencing

Pig Iron, Blooms, Billets, Hard Spring Coil Wire, Twisted Cable Wire, Telephone Wire, Bale Ties, Steel Hoops, Steel Bands, Cotton Ties

We are prepared to make prompt shipment, and solicit your inquiries accompanied by complete specifications

ADDRESS
PITTSBURGH STEEL COMPANY
Export Dept., Singer Building
NEW YORK CITY, U. S. A.
Cable Address: "Pittsteel"

Commerce and Industries.

A.B.C. Bank.

Lord Midleton, presiding at a meeting of shareholders of the African Banking Corporation, dwelled on the bright prospects of South African commerce. Indeed, he said, owing to large purchases by the Imperial Government, there had been a considerable agricultural revival, succeeded, however, by a little reaction which, he hoped, was now passing away. He strongly urged the exercise of economy in order to meet any depression that might occur after the war. He remarked that the gold industry showed no diminution of strengthening the whole sinews of the Empire. Sugar growing in Natal was forging ahead.

* * * *

Double Income Tax.

A meeting convened at the request of merchants, shippers and others interested in Imperial trade and finance, was held in mail week at the Bank of Adelaide, Leadenhall Street, London, to consider the question of the double payment of income-tax by residents, firms, and companies who derive income from the Oversea Dominions. Sir Westby Perceval was in the chair. Mr. J. J. Jenkins explained that in a reply received recently from the Chancellor of the Exchequer it was stated that the matter was one which should be dealt with in connection with the Dominions Overseas. The Premiers of most of the Dominions would probably be in England in the early part of next year, and it was, therefore, now thought advisable to raise the question again in order that it might be brought before representatives both of the Dominion and British Governments. The Chairman said nobody sought to escape his fair share of the nation's burdens, but it was a poor return for what other parts of the Empire had done that those who came from them should have to pay war taxes twice. He moved a resolution, which was carried unanimously, declaring that the double, and, in many cases, treble income-tax inflicted upon residents, firms, and companies in the United Kingdom who earned income in other parts of the Empire was unjust, inequitable, and contrary to Imperial interests. He added that the committee would work in conjunction with the committee which had been formed by the Chambers of Commerce. An executive committee was formed to make the necessary arrangements for bringing the matter before the Imperial Government and the various Colonial Governments.

* * * *

Telephone Directory.

The reply of the Postmaster-General to the Chamber's representations regarding the new Telephone Directory states:—"(1) Position of Advertisements: It is regretted that the arrangements which have been made on behalf of the Government in connection with the advertisements in the book are such as not to admit of any alteration in their form or position being effected at the present time. The representations of the Chamber on this point will, however, be given careful consideration when new advertising arrangements require to be made. (2) Size of Type: A comparison of the type used for the Transvaal-Natal Directory with that utilised by other Administrations and Telephone Companies for their directories does not show up the former publication unfavourably. It is thought that the type is sufficiently clear for all practical purposes, and in view of the fact that use of different type would involve the Government in considerable expense, it is not considered that a change would be justified at present. (3) Errors in Publication: With regard to the errors which have occurred in the bold type entries, it has been arranged that in future the 'proof' copy of all such entries shall be submitted to this Department in order that they may be carefully checked in the Telephone Branch. The whole of the matter for publication in the Directory will come before the Telephone Branch for review before the actual printing of the copies is proceeded with, and it is hoped that this will have the effect of reducing the number of errors to a minimum. It may be added that, so far as can be discovered, the errors which are attributable to the Post Office number eight only out of 18,000 entries. This, it will be readily admitted, gives a very small percentage for a work of the nature and magnitude of the Telephone Directory. A list showing the corrections which require to be made in the book, as well as the additional subscribers up to date, is now being printed and will be distributed shortly."

* * * *

Work of the Munitions Committee.

The making of munitions is proceeding satisfactorily on the Rand, and the only grievance of the committee in charge is that it has not yet received instructions to go ahead on a large scale. The hand grenade is a special feature. The last tests of these deadly implements of trench warfare proved most successful. One thousand completed "bombs" will be sent off this week, and another thousand will be completed during the following week. Six catapults will also be supplied by the committee with this order, and as the use of the catapults and grenades is easily mastered, this section of the German East Expedition should give a good account of itself. The latest task set the committee is the supply of 250 specially-designed compasses. These compasses are for use in the bush, because it would be an easy matter for a body of men to get lost in the forests of the territory which must be conquered. The faces of these compasses are illuminated for use at night time. Government has also asked the committee if it would be prepared to make a large number of buttons. The reply was in the affirmative, with a request for samples. It is the proud boast of Mr. Ingham, Chairman of the Committee, that they can make anything Government requires if they are given a week or two to perfect their plans. Government is now giving the committee a chance in several directions, of which details are not available for publication. The big question is the development of munition making on a large scale, in order to assist the Imperial Government. An Imperial officer, who was sent up to investigate from the point of view of manufacture for export, has given an excellent impression, and his favourable report may lead to big things. At present about a hundred women workers (voluntary) are on the books, and there are fifty to sixty at work all the time. At any moment many more may be required. There would, naturally, be hundreds of women available, but only a small percentage can afford to follow present lines of honorary work.

Cables:
"McKECHNIE, WIDNES."

McKECHNIE BROTHERS, LIMITED.

SMELTING WORKS: WIDNES, ENGLAND. LONDON OFFICE: 11 LOMBARD STREET, S.E.
Also at BIRMINGHAM, NEWCASTLE and MANCHESTER.

BUYERS of
COPPER, SILVER *and* GOLD CONCENTRATES,
ORES, MATTES *and* PRECIPITATES.
COMPLEX ORES
METAL RESIDUES *and* SCRAP.

Engineering Notes and News.

THE DISTRIBUTION PLANT OF THE JOHANNESBURG MUNICIPAL ELECTRIC SUPPLY SYSTEM.—II.

A Vast Municipal Area—Domestic, Industrial and Lighting Arrangements—Interesting Technical Description.*

[By J. H. Dobson, M.Sc., M.Eng., M.I.M.E., M.I.E.E., A.M.Inst.C.E.]

The service connections from the distributor cables to the consumers' premises were attached to the sub-distributor cables through cast-iron tee boxes which were also filled with insulating compound. The other ends of the service cables were connected through the Council's fuses and meters to the consumers' main switches and mains. In this way the most important business portion of Johannesburg, containing all the largest commercial houses, theatres, hotels, etc., were given their electric supply. In brief, each feeding area was entirely independent of the others and was a system of copper conductors rigidly bolted together through the studs and links at the surface boxes. What happened when a fault developed on any portion of this network will be obvious to every electrical engineer. In the first place, the automatic circuit breaker at the power station would operate and cut off the supply to its feeding area, leaving about one-tenth of the inner area of Johannesburg in darkness. The procedure of despatching men to the feeder box to disconnect and reconnect the distributor cables, and the time taken to locate the fault will be understood. Time and circumstances never permitted the ordinary method of testing, because all the switches in consumers' premises would be left closed, most of the faults being located after a public display of electrical fireworks, with appreciable danger to the distribution employees. As there was only one feeder to one feeding area, the amount of time that important portions of the town could be left in total darkness can be imagined. Communications with the power station to put in the feeder had to be done by special messenger with mechanical locomotion, as public telephones were generally not available under such special circumstances. The system as described had to be entirely reorganised. This was rendered very necessary by the frequent interruptions caused by faults in the direct current feeders. Owing to the vulcanised bitumen becoming soft and plastic the whole of them decentralised at loads representing a less current density than 600 or 800 amperes per square inch; in fact, some of the square inch feeder cables never carried more than 300 or 400 amperes, yet decentralised. The causes of the decentralisation I hope will be dealt with in the course of the discussion on the paper. The obvious lesson to be learned from this unfortunate experience is to avoid using any type of armoured cable which may become plastic under any condition whatsoever. The result was that the resistance of the cables dwindled down to practically nothing, and short circuiting between the copper and the steel armouring was a regular occurrence. Such a state of feeder cables attached to a system as has been described and coincident with the failure of the gas engine scheme, made conditions absolutely appalling, and the author hopes that he will never again be saddled with the responsibility for the continuity of an important public lighting supply under such trying conditions. Such is the description of this portion of the distribution plant in 1909. It was evident that very drastic measures had to be adopted, but so much money was involved on the system as a whole that the best arrangements had to be made of the existing cables. From the technical point of view the system might have been entirely changed and the feeder cables scrapped, but financially it was impossible, and the reorganisation of the system which was decided upon could only be done in small portions and took several years to execute. Expressed briefly, it was decided to carry out the following work:—

FEEDER CABLES PICKED UP AND RE-INSULATED.—Pick up all the feeder cables, strip off all the armouring and relay them again on the "solid" system by placing them in glazed earthenware troughs with proper bridge pieces, the whole to be filled in with bitumen and the troughs covered with hard blue bricks. It was first necessary to run an additional feeder to the centre of the town so that the feeders could be relieved one by one. By the time the work was completed the additional feeder was absorbed in the growth of the load.

INSTALLATION OF UNDERGROUND CHAMBERS AND PILLAR BOXES.—All the feeder and sub-feeder pavement surface boxes were discarded excepting a few sub-feeder boxes in unimportant parts of the town. Underground chambers were erected at all the feeding points, and feeder pillar boxes similar to post office pillar boxes were erected at all the important sub-feeding points. *Underground Chambers.*—These are fitted with suitable draining and ventilation arrangements. The roof of the underground chamber is flush with and forms part of the pavement, and there is a watertight manhole cover fitted with suitable keys, and entry to the chamber is by means of a ladderway from the manhole. The plan of the feeders is shown, and it will be seen that with the exception of the two feeding points at the extreme east and the one feeding point at the extreme west of the inner area, two or more cables pass each feeding point. The arrangement of the underground chambers at the feeding points admit of all the feeder cables passing that point being looped into the chamber, thus providing a duplicate or triplicate feeding supply to all of them except those mentioned. With regard to the two feeding points at the extreme east, this happens to be a part of the inner area which is not fully developed, and the demand is neither important nor large; the result is that the distributor cables connecting the two feeding points complete a ring and provide a duplicate supply to each underground chamber. With regard to the one at the west, at the time of writing this paper there is a duplicate cable being run as it cannot economically be looped with any other chamber. Busbars and switches are arranged in each underground chamber for dealing with the duplicate or triplicate supply as the case may be. The ends of the distributor cables are connected to special busbars connected to the feeder busbars through isolating swicthes, and can be quickly disconnected. In each chamber there are pilot lamps arranged on each of the feeders brought in and telephone communication installed direct to the main switchboard at the power station, without having to ring up the public telephone exchange. The underground chambers are all of the same design. *Pillar Boxes.*—At the chief sub-feeding points on the distributor cables feeder pillars were installed to take the place of the surface boxes. The arrangement of busbars and the connections to the sub-distributors through isolating switches can be observed. An important feature is that wherever possible the two ends of the distributor cables are connected to two underground chambers, and the two ends of the sub-distributor cables are connected to two pillars. Again, in many cases electrical supplies to important buildings have been run back to the pillar boxes at slight additional cost, but at additional security to the consumer. *General.*—Regular testing on the cables is now carried out and possible trouble foreseen and attended to. The above alterations in the inner area took over three years to carry out, and although it is not contended that the system is now perfect, little or no trouble has been experienced since the changes have taken place, a fact which has been appreciated by the public. The stripping and relaying of the feeder cables has been a little disappointing, owing to the fact that decentralisation has taken place to a much greater extent than was anticipated, and consequently the insulation resistance is relatively low. It might also be stated that wherever faults have developed in the distribution cables at the cast-iron joint boxes (a very common occurrence), the joint has been remade in the cable, the joint boxes discarded, and the joint insulated and finished off in the same manner as the cable itself. With the aforementioned modifications it has become possible to greatly improve the distribution of pressure throughout the inner area. A study of the plan of the main feeders will indicate possible trouble in this respect, as the feeders vary greatly in length, but at the time of reading this paper the loads on the feeders are such as to equalise the fall of potential along the cables. In other words, it is fortunate that the heaviest loads are on the shortest feeders. Should the load on the inner area continue to increase at the present rate, the installation of boosters in certain of the feeders may become necessary. Alternative to this, the growth of the load may be such as to render additional copper necessary in the nature of new feeders to certain points, and the question will then arise as to whether the load cannot be more satisfactorily dealt with by a sub-station in the centre of the town. The division and magnitude of the load at the present time are such as to render such additional steps unnecessary. In addition to the adoption of underground chambers and pillar boxes, some other points are worthy of consideration. Metallic joint boxes on a distribution system should be eradicated and the cables jointed and insulated like the main cable wherever possible. In a congested area where the layout of a town or city is similar to the centre of Johannesburg, service connections are better run back to a suitable chamber situated in a position to deal with four blocks of buildings, each connection being suitably fused. Of course, it will increase the length and cost of the service connections, but this is a very small matter compared with the importance of continuity of supply to the type of consumer situated in the centre of an important city, and a fault on one service connection on the system suggested will not interfere with the distributor cable. The location of a fault would be greatly simplified and the thousands of service joint boxes eliminated, which are perhaps the weakest points in a distribution system.

SECTION II.

DISTRIBUTION SYSTEM OF THE "OUTER" AREA.

The outer or suburban area comprises all the area of supply outside the inner area, with the exception of Newtown, which is a recently-developed industrial area having an entirely distinct three-phase four-wire supply. The single-phase supply in the outer area is given by high tension feeders to the various suburbs at 3,300 volts. The current is sent through transformers and is transformed down to a pressure of 400 and 200 volts on the three-wire system, distributed by underground and overhead networks. The high tension cables are of the two-wire concentric paper insulated and lead covered type. The inner core is insulated for 3,300 volts and the outer core, which is earthed, is only provided with insulation for about 500 volts. They were laid on the solid system, *i.e.*, laid in earthenware troughing, filled in with pitch, and the whole covered with a thick tile or brick. This system of laying is a very good one, both from an electrical and mechanical point of view. The high tension cables terminate in kiosks situated in the various suburbs and districts, and transformers are erected with the necessary switch-gear for transforming to 400 volts. Two-thirds of the kiosks are of the round pattern taken over from the old three-phase pioneer lighting scheme, whilst the others were new and rectangular in section. The gear erected in these kiosks consisted chiefly of the high tension cable simply looped into and bolted direct to the high tension terminals without any disconnecting links or switches. The connections to the transformers were carried through high-tension fuses. The low-tension leads were bolted to the low-tension busbars, from which were taken the various circuits of the distributor networks through fuses. The high-tension cable was then carried to the next transformer kiosk and to the next and so on. In certain cases there may have been six or seven kiosks all connected to the same high-tension cable without means of disconnecting, whilst the cable was "alive." With regard to the working of the system, the method of laying and the type of high-tension single-phase concentric cables were quite good, but unfortunately two high-tension cables were laid in the same earthenware trough wherever two cables ran in the same direction. Experience proved that whenever a fault occurred on one of the cables in the troughing it often affected the other. To put two cables in one trough not only proved false economy, but it doubled the extent of the damage, as well as the magnitude of the interruption of the electric supply. It will be understood that when a fault occurred on one of the high-tension cables all the districts served by it were without electric supply. To locate the fault with the high-tension cable bolted hard on to each transformer, was a very lengthy process, especially as there were no easy means of splitting up the high-tension cable into sections. There were certain disconnecting boxes where one high-tension cable was led off into two or more directions, but the excavation work required to get at such boxes, and to melt out the insulating compound, took hours of labour for the process of disconnecting. Generally speaking, owing to the fact that the transformers depended for their supply entirely on one high-tension cable, any fault on the latter meant a day or even more to locate it and put matters right. Again, if any of the high tension fuses blew in the transformer kiosks, although the low-tension fuses might be removed, it was a very dangerous process to re-insert the high-tension fuses that had blown when the high-tension busbars were alive, more especially if it were a fault on the transformer itself. Of course, a safe measure would have been to put the whole of the districts served by the particular high-tension cable in darkness until the high-tension fuses had been re-inserted. This safe procedure was very seldom adopted, as every endeavour was made, although dangerous, to meet the public convenience by not putting the other districts into darkness. As each district depended for its supply on one transformer, if it were at fault the replacement of the transformer could not be attempted in the hours of darkness owing to the incoming cable being alive, and the contact areas were so small that continuous trouble resulted by their heating at the contacts, a result which could be expected from an examination of them. There were no inter-connections between the low-tension network of one transformer with that of another. The system thus described could only be regarded as unsatisfactory and the public and press of Johannesburg soon made it clear, in unmistakable terms, that they would not tolerate a system, a single fault upon which would, and did, mean total darkness in important suburbs for considerable periods, more especially where five or six miles of high-tension cable, without any means of disconnecting it into sections, had to be inspected and tested, often involving excavation work to a depth of from 6 to 8 feet through hard macadamised road. From the operative point of view, the transformer kiosks were veritable death-traps, and I need not refer to the hideous accidents that have occurred on them, but it is more than probable that in European countries a merciful Government control would have prevented their use. The general scheme for improving the system to the outer area consisted of : (a) The installation of link chambers and pillar boxes for high-tension cables. (b) The linking up of high-tension mains to form ring mains. (c) The grouping of transformers. (d) The replacement of certain of the iron kiosks by brick transformer houses. (e) The installation of proper control gear in all transformer kiosks. (f) Minor rearrangements.

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* Paper read before the S.A.I.E.E.

(To be continued.)

Allgemeine Elektricitats Gesellschaft.

As a result of the war the directors of the A.E.G. state that they refrain from giving details of the manufactures during the year ended with June 30th, 1915, and the annual report is, therefore, much shorter than has been customary in former periods. It states that the workshops were well employed on articles of peace and war, and were available to a wide extent for the defence of the country. It was not always possible to obtain appropriate compensation in the fixing of sale prices for the considerable rise in wages and in raw materials, especially as the prices agreed to were confronted with greater wear and tear of the machinery and machine tools. The quick and extensive provision of workshops and equipment rendered it possible to effect the transformation in working. The company was, consequently, able to undertake orders for airships and munitions, particularly shells, fuses, cartridges, and grenades, and extensive light and power installations for the Army authorities and for chemical and powder factories had to be carried out. Large guarantees in the form of allocations to the reserve funds had been made for the undertakings in and debts due from hostile countries and across the sea. The A.E.G.—Union Electrique, of Brussels, had been able to pay 6 per cent., which was, approximately, the same as in 1913-14; the Italian A.E.G.—Thomson-Houston Co., had again paid 6 per cent.; and the A.E.G.—Union Elektrizitats Gesellschaft, of Vienna, 4 per cent., as against 8 per cent. in 1913, and the company was well occupied at present. The branches in Scandinavia, Switzerland, Spain and Holland had carried on business satisfactorily.

Zaaiplaats Tin.

The results for the month of December, 1915, were as follows:—Days run, 28; ore milled, 3,742 short tons; residues re-treated, 2,016 short tons; concentrates won, 35 long tons; average value of concentrates, 70 per cent. metallic tin; estimated loss for the month, excluding Government taxes on profits, £537 1s.; add adjustments in respect of estimated values of previous shipments, £348 19s. 5d.; loss declared for the month, £886 0s. 5d.; capital expenditure, nil. Revenue for the month has been calculated on the basis of tin at £170 per ton. The reduced output is due to the continued falling off in grade in No. 13 section. Latest information from the mine is to the effect that an improvement is now noticeable in the main ore body in this section.

Nyassa Company.

The report of the Campanhia du Nyassa for the year ended 31st December, 1914, states that the total revenue of the territories was £73,718, a decrease of £4,386, and the total expenditure of the territories £72,249, an increase of £5,520. The decrease in the total revenue and increase in the total expenditure are not so great as might be expected. Of course, only the sums actually paid are included in the expenditure, and to this must be added other items which were not paid at 31st December, 1914. Although the total receipts for 1914 were lower than those for 1913, they were practically the same as those for 1912. The ravages of the cyclone in April, 1914, destroyed or damaged not only the buildings of the company in Porto Amelia, but much valuable material. Owing to the temporary transfer of the finance department to Ibo, and other subsequent happenings, it was not possible so to revise the inventory of the property of the company in the territories as to eliminate all the property destroyed and to place fresh values against goods that have been damaged. This work is being proceeded with, and the directors hope will be completed during the present year. Owing to the same abnormal causes, which occurred during last year and continue during the present year, the directors have not yet given effect to the decision of the extraordinary general meeting held on the 8th December, 1913, in view of the fact that the position arising out of these causes will require other steps of a financial character to be taken, which the administration of the company is now studying.

"SKEFKO"
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Company Meetings.

VAN RYN GOLD MINES ESTATE.

MINE CONTINUES TO DEVELOP SATISFACTORILY.

Reduced Interim Dividend.

The 20th ordinary general meeting of the Van Ryn Gold Mines Estate, Ltd., was held on December 15th at Winchester House, Old Broad Street, London, E.C., Mr. F. A. Gillam (chairman of the company) presiding.

To receive the directors' report and statements of account to June 30th, 1915; to elect directors in the place of those retiring by rotation; to elect auditors and fix their remuneration; and to transact the business of an ordinary general meeting.

Mr. T. Fredk. Thorne (secretary) read the notice of meeting and the report of the auditors.

The Chairman said: Gentlemen,—For the 20th time in the 21 years during which I have been your chairman I have the pleasure to preside at the annual general meeting of this company. I think you will agree that the report and accounts which we submit to you to-day (and which I will ask you to be good enough to take as read) are satisfactory documents when one takes into consideration the abnormal circumstances ruling to-day. You will note that there has been a small decrease in the amount of gold produced, resulting from the fact that the average value per ton of the ore shows a reduction as compared with the previous year. This has been partly offset by a reduction in the working costs of 1s. 2d. per ton, so that the net decrease in the profit is but 8d. per ton. With regard to ore reserves, you will note from the manager's figures that our fully-developed ore reserves remain at very nearly the same tonnage as they were a year previously, but show a slight drop, fractional only, in the average value. Generally speaking, the operations of the mine during the year have run smoothly, and more or less on normal lines.

Capital Expenditure.

With regard to capital expenditure, you will note with satisfaction that this has been reduced to a minimum, and that we have not had to increase it during the current year. We hope that this item will not figure again very largely in our accounts. In any case, whatever the capital expenditure is, we have made it a practice always to write it off during the year in which it has been incurred. That practice has been adhered to in the accounts before you. The question of our water supply is, I am pleased to say, one which no longer causes us any immediate anxiety. You will see from the directors' report that, owing to copious rains during the last wet season, our dams are full, and will provide the requirements of the mine for some time to come. As to labour, there has been a good supply of natives during the year under review. To some slight extent the supply of white labour has diminished, thus necessitating the curtailing of some of the work done by white workers at the mine. The fact that the supply of native labour has not been interfered with has enabled us, fortunately, to keep up our development, with the result, as already mentioned, that our reserve of developed ore has been maintained. It is always a pleasant thought to dwell on that these ore reserves of nearly two million tons have been paid for out of past profits. While on the subject of development, I take the opportunity of informing shareholders that since the beginning of the current financial year we have reduced from 1s. 9d. to 1s. per ton milled the amount charged to working costs for development. Experience during the past few years has shown us that the amount charged to working costs for development has been more than enough to pay for current development work, while still maintaining our reserves. Consequently, under existing circumstances, we felt we were justified, with the concurrence of the managing director, in reducing the charge to the figure I have stated. The campaign in South-West Africa, so brilliantly conducted and successfully carried through under General Botha, has naturally involved us in certain heavy charges on the other side. A special war levy has been put upon the mines, amounting to half the ordinary profits tax. The contribution due from this company under this heading alone will amount to £12,000, and we must also face the possibility of other expenses incidental to the present state of affairs.

Interim Dividend.

It is, perhaps, unnecessary for me to mention that these abnormal expenses have naturally influenced the board in considering the question of the amount of interim dividend we should distribute for the current half-year. Added to this is the important fact that our gross income from gold for the five completed months of the current year is not so large as for the corresponding period of last year by approximately £20,000. Consequently the board has had to decide upon the exceedingly delicate question of choosing between two policies—namely, continuing the old rate by entrenching somewhat seriously on the company's cash reserves, or adopting the less pleasant, but in their opinion sounder one, of reducing the interim dividend. After careful consideration they chose the latter, and I am authorised to announce the declaration of an interim dividend of 17½ per cent., or 3s. 6d. per share, for the half-year. I feel sure that shareholders will appreciate the feeling of prudence which actuated us in making a reduction which brings the amount to be distributed within the actual net profits earned during the period. Shareholders will observe that, according to our balance-sheet, we have a large sum invested in the War Loan.

Untiring Care of the Messrs. Albu.

In conclusion, gentlemen, I should like to state what a pleasure it is to me to preside at these annual meetings, more especially when, in spite of all the difficulties and restrictions that hamper operations when a country is in a state of war, we are able to come to you with the results that have been reported. It is our usual custom to pass a vote of thanks to Sir George Albu and his staff for their efforts on our behalf, and I think that on this occasion, more than ever, our thanks are due to them for their untiring care of our interests. I formally move that the report and accounts submitted to you be received and adopted, and I will ask Mr. Burns to second the resolution.

Satisfactory Cable Message.

Mr. L. B. Burns: Gentlemen, I beg to second the adoption of the report and accounts. I am sorry to tell you that Mr. Leopold Albu, who usually performs this office, is suffering from indisposition. He is confined to his room and unable to come and speak to you to-day. I am sure it must be a great disappointment to him; in fact, he has sent word to me to say that it is, and I am sure it is also a great disappointment to us all that we shall not hear to-day those illuminating remarks which Mr. Albu has been accustomed to address to us on these occasions. However, we shall not be without what I may call the Albu touch to-day, because this morning we have received a cable from Sir George Albu, our managing director, which I will read to you. He says: "The number of white employees of the Van Ryn on active service is equivalent to 10 per cent. of the underground and 17 per cent. of the surface complement. The married men receive half-pay from company in addition to Government separation allowance; single men without dependents quarter-pay from company during active service. Mine continues to develop highly satisfactorily both as regards current developments and indications given by reinvestigation old workings." (Hear, hear.) I think, gentlemen, you will all agree that this is a very satisfactory message to have received from our managing director. If I may add a word on my own behalf in support of the resolution, I should like to say that I think it is a matter of satisfaction and congratulation that, notwithstanding the difficult times in which we are living—a world-wide war in the throes of which we are—the Van Ryn Company is able to make so good a show and to place before you so good a report as that which is submitted to-day. I have much pleasure in seconding the resolution.

Good Work of Gold Mining Companies.

Mr. Vere Herbert Smith said that when he had the pleasure of seconding the vote of thanks to the board and the staff at the annual meeting which was held on 16th December last, he referred to the good work which had been done by gold-mining companies. He recollected saying at that meeting that they were all naturally extremely pleased to receive their mining dividends, notwithstanding the fact that war sometimes necessitated their receiving a little more and sometimes a little less. Those, he thought, were his exact words. Apparently to-day in this company they were going to get a little less; still, he did not think they ought to feel disheartened in regard to that. He knew that they had a very cautious board of directors, and although the interim dividend would be less than usual, he hoped that when the final dividend was paid the total dividend would amount to what had been paid in the previous year. Mr. Burns, in seconding the resolution, referred to the number of the company's employees who were on active service. He (the speaker) thought they might congratulate themselves upon the fact that so many of the staff in South Africa had been able to be spared to fight for their country, but he also thought that those men who could not be spared, and who were working in the mines, should realise that in helping to win the gold which the world wanted so much at this time were really doing their bit for this country. (Hear, hear.) As Englishmen, they must feel that they were just as much indebted to them for continuing to work assiduously in the mines as though they were actually engaged in the fighting line. (Hear, hear.) He had had the opportunity of speaking at the meetings of several gold-mining companies during the last few months, and he thought that he had gone rather out of his way to point out this fact, because gold was taking a very active and a very essential part in the prosecution of this war. He had also been told that in the West End of this great Metropolis their managing director, Sir George Albu, had lent his house as a hospital, so that it was very evident he was doing his bit—(hear, hear)—for not only was he remaining at his post at the mine as their managing director, but he was also helping to assist the wounded in this country. He (the speaker) did not think he had anything further to say, but he hoped to be allowed at the close of the meeting to propose a hearty vote of thanks to the company's officials on the other side.

A Word of Appreciation.

Mr. A. V. Neville remarked that he had forgotten whether at the last meeting he proposed or seconded the vote of thanks to the staff for the valuable services which they had rendered, but whether he did or not, he would be very pleased to second the proposition which Mr. Vere Herbert Smith had intimated he would bring forward. The chairman had expressed the pleasure which he experienced in presiding over the meeting that day, and he (the speaker) was equally pleased at seeing Mr. Gillam in the chair. He offered him his best wishes, and hoped that he would continue to fill that position for many years to come. (Hear, hear.) Mr. Vere Smith had said that he hoped the next dividend would be at the same rate as formerly, but he (the speaker) would go further than that. He understood that the reduction in the interim dividend was merely a measure of precaution, and if at some future time—some happier time—the directors could see their way to add the 1s. which he understood was to be deducted from the next dividend, he hoped it would be forthcoming, and, if so, the shareholders would be very grateful. (Hear, hear.) It would help to discharge that burdensome income-tax, which pressed so hardly and harshly upon most people who had money invested in gold mines. He had said before, but it would bear repetition, that the Van Ryn was one of the few companies in regard to which no reasonable or fair-minded shareholder had any ground for complaint either as to the management, direction, or control. (Hear, hear.) Throughout the 20 years to which the chairman had referred he (Mr. Neville) did not recollect anybody having made any comment which could be regarded as adverse either to the board or to anybody connected with the management, and, therefore, he would have much pleasure in supporting Mr. Vere Smith when he proposed his resolution of thanks to the chairman, the directors, and the staff in London, and to the managing director and the whole of the staff in South Africa, whose work had contributed so much to the success of the company.

Mr. Peacock: Mr. Chairman, I have been in the habit of congratulating the board on their very successful management of this undertaking. I have been a member of this company for a good number of years. The present report is exceedingly lucid and satisfactory as far as it goes, but I gather from the reduction of the dividend that the reason is the excessive war tax in South Africa. Am I right in saying so?

The Chairman: Partially.

Views on the War.

Mr. Peacock: I will, with your permission and that of my fellow-shareholders, give my views on the probable war future. I have lived the greater portion of my time in France. I know that country and speak its language as my own. I know the feeling of the French people well, and can assure you that there is no more probability of peace being made with Germany on the basis of the terms now suggested in Berlin and elsewhere than there is of my eating that table along with the directors who are behind it. (Laughter.) I repeat—I know the country, and the peace terms will not be such as they were when, in 1871, a German *corps d'armeé* walked down the Champs Elysees, but they will be made when a French *corps d'armeé* walks down the Unter den Linden, and France will never sheathe the sword until that is done. With regard to peace terms, I hope to live to see the Germanic Confederation put back into the state it was before the battle of Koniggratz, in 1866—that is, that each country will be a country by itself, and not all subject to Berlin domination. There will not be a Germanic Confederation, but there will be Prussia, there will be Baden, there will be Bavaria, and there will be Wurtemberg—all with separate armies, but not *in globo*, and I hope to God we shall all live to see that. (Loud cheers.) You may make up your minds that, as long as the war continues, this extra dividend will not be paid unless the board trench upon the company's private resources.

Sir George Albu and the War.

Mr. N. Herbert Smith: Mr. Chairman, will you permit me to intervene for one moment? I only want to refer to one remark my brother (Mr. Vere H. Smith) made in regard to Sir George Albu. I sit here as his alternate. I should like to say this, that it is the fact that he has lent his house for hospital purposes, but not only that—he has a son, his only grown-up son, who is serving in the Flying Corps, whilst his two daughters are actively working in the hospital to which Sir George has made financial gifts. (Cheers.) I should like to add this, because he is always foremost in good works, and I think these facts should be known. (Cheers.)

Mr. Lett: May I suggest that in future reports we should be given a sketch plan of the mine, so that we may intelligently follow the workings? Without a sketch plan we know nothing of what you are doing.

The Chairman: I have to thank all you gentlemen for your kind remarks, which have certainly been very favourable. With regard to the plan, we used to provide one, but found it so expensive and so elaborate that we ceased to issue it.

Mr. Lett: I suggest that a simple sketch plan would suffice, so that we could follow the developments as closely as we can.

The Chairman: We will try to meet you in that way. The resolution I have to put is for the adoption of the report and accounts. Mr. Burns has seconded the motion. Will those gentlemen who are in favour of it kindly hold up their hands. Those against it. I am sorry it is not quite unanimous, as there is one dissentient, but that dissentient has not given any reason. (Cries of "Give reason!")

The Shareholder: I do not think there is sufficient cause for reducing the dividend to the extent proposed.

The Chairman: The next resolution I have to propose is: "That Messrs. Leopold Albu and P. G. Hamilton Carvill, who retire, be re-elected directors of the company," and I will ask Mr. Burns to second that also.

Mr. Burns: I beg to second the motion.

The Chairman: These gentlemen have both been directors for many years, and it has been my pleasure to propose their re-election at many meetings. Those in favour; those against—carried unanimously.

Mr. Peacock: I beg to propose the re-election of the auditors, Messrs. Deloitte, Plender, Griffiths and Co., at a fee of 80 guineas.

Mr. Lett seconded the motion, which was carried unanimously.

The Chairman: That concludes the business of the meeting

Thanks.

Mr. Vere H. Smith: May I now, Mr. Chairman, formally propose my resolution: "That a cordial vote of thanks be given to you for your conduct in the chair, to the board of directors for their work during the past year, to the staff here in London, and also to the managing director and staff in South Africa." I was very much interested to hear the remarks made by Mr. Peacock on the subject of peace. I also was living in France at the time he mentions, when the peace after the last war was concluded.

Mr. Neville: I desire to associate myself with the remarks which have fallen from Mr. Vere H. Smith, and I second the vote of thanks he has proposed.

The motion was carried unanimously.

The Chairman: On the last occasion Mr. Smith asked that we should cable this out. Is that his wish now?

Mr. Smith: Yes, certainly; although we are not as rich as we were. (Laughter.) I should like particularly to have this done, after having heard that our managing director has done more for his adopted country than we previously knew.

The Chairman: We will carry out your wishes.

The meeting then closed.

DAGGAFONTEIN PROSPECTING.

SCHEME OF THE GOLD MINING COMPANY NOW PRACTICALLY COMPLETED.

The seventeenth ordinary general meeting of Daggafontein Prospecting Syndicate, Ltd., was held on December 21, at Egypt House, 36, New Broad Street, E.C., Mr. Roger C. Richards presiding.

The Chairman said: The report is very short indeed, and I might say, from one point of view, it is scarcely worth troubling you with. As regards the accounts, there is really nothing calling for any comment. The most important point to consider is the position which has arisen from information which has been conveyed to you in the public press, and also by circulars which have been issued by the Daggafontein Gold Mining Co., and it may be very useful for us at this point to review the position of this syndicate, what it has done, and its raison d'etre generally. This syndicate was formed in 1889 with a capital of £30,000, the intention being to do certain exploration and boring work on the Daggafontein property, and, in consideration of doing that, they took an option to form a company. The South African war intervening, it was perfectly impossible for your directors to proceed with any work on the Daggafontein property, but relying as they did upon the geological information at their disposal they decided, when the war was closed, to proceed at once, without any exploratory work, to form the Daggafontein Gold Mining Company. They were satisfied that the property was good; they were satisfied, as far as they could be, that the reef underlay the whole of the area, and they were also satisfied that whatever might happen a certain revenue was being derived from Daggafontein all the time, and that there were no claim licences to be paid. At any rate, they exercised their option without spending money upon any preliminary boring work. For the purpose of giving a basis to the company 30,000 new shares were issued at a premium, and then this syndicate took an interest in the Gold Mining Company, of about £100,000. It so happens to-day that that interest remains practically unchanged. What I want to emphasise is this: that at the outset the then directors of this syndicate took what might have been called at that time a very sanguine view about the value of the Daggafontein property, and that view has been entirely confirmed. As I said before, we were quite certain from the outset that the reef underlay the whole of the property. The only fault we have got to find with it is that it is a little flat, and therefore probably we shall not get such a big tonnage of ore per claim as we should have done had the dip been steeper. On the other hand, probably had the dip been steeper the ground would have been more disturbed.

An Important Point.

Now I come to a very important point. You are aware that the area of the Daggafontein farm is about 9,235 acres, which is equal in all to about 6,283 claims. That does not represent the amount to which the Daggafontein Gold Mining Company will be entitled on proclamation, but it represents the whole area, and I want you to bear in mind that this is a deep level proposition. The shaft has gone down between 3,500 and 3,600ft. Representation is being made to the Union Government in order to secure some consideration for those who have risked such large amounts of money to prove the existence of the reef in the Far Eastern Rand. Those representations have met with a favourable reception, but the question arises naturally: "Yes; it is all very well; you have incurred great expenditure, and we quite appreciate what you have done; but what we want to know is, having spent so much, are you able to continue the expenditure necessary to instal the plant necessary for dealing with such an enormous areas?" That is the point that the directors of the Gold Mining Company had to consider, and representing, as we do to-day, a large interest in the Gold Mining Company, I want you to bear that in mind when you are weighing the importance of any arrangements which have been made for continuing the work on this property. Those arrangements have been made by three or four of the most powerful mining groups in South Africa. Well, that ensures two or three things. It ensures, first of all, that the capital, when required, will be forthcoming for carrying on your work to its ultimate issue on the largest possible scale, should developments warrant it. It ensures another thing; it entirely sets aside any question that might be raised by the Government in South Africa as regards the capacity of those undertaking the work to carry it through to a successful completion. Then, so far as our share interest is concerned, it carries with it this further point: it is perfectly true that by the scheme our share holding will be cut down to one-third; that is to say, putting it broadly, instead of having, as we have to-day, 100,000 shares in the G.M. Co., that number will be cut down to say 33,000 or 34,000. Yes, but those 33,000 or 34,000 shares will probably represent not such an area as we should have had under the old conditions, of something like 1,436 claims, which, after all, is a vast area as a mining proposition; but, if one's expectation is realised, it is probable that we shall be able to secure from the Government a grant to the Gold Mining Company of a much larger claim area.

A Favourable Arrangement.

My point is that although we do get our shares cut down by two-thirds, we shall probably get our total mining area increased by an amount that would amply compensate for that apparent loss. I am putting that forward as my own opinion, and I think it is a matter that we ought to bear in mind when we are weighing the advantages or the disadvantages of the scheme which has been entered into. I think it must be obvious to all of us that had it not been for the special conditions which the war has brought about we probably should have got the capital on easier terms; but, speaking for myself as representing a large number of shareholders, I am quite satisfied that the arrangement which has been made is one which, under the special conditions, is extremely favourable to all the shareholders of the Daggafontein Gold Mining Company, and therefore to this syndicate, as the holders at present of a large number of shares. I believe that, with the information furnished by the public press you are practically in as good a position as I am myself for forming your own judgment upon the scheme, and I am putting forward that point of view, as it may not have occurred to you. I do not think I have anything further to add, and I will, therefore, move that the report and accounts be adopted.

Mr. G. A. Murray, in seconding the resolution, said that a circular had been issued the previous day by the Daggafontein Gold Mining Company, saying that although the scheme was well advanced, it had not yet been completed. He could tell the meeting that it was now practically completed. There were certain things to be adjusted, and when that step was done the directors would be able to submit the scheme, and, he believed, carry it through. It was the duty of those connected with Daggafontein, and in the interests of the shareholders of the various concerns and of South Africa itself, to see that a large and important gold-mining property like Daggafontein was brought to the producing stage. Of course, it would be no easy business, as, apart from engineering, it required a certain amount of finance, but there was no doubt about that being provided. What they had to guard against as directors of the syndicate was that no assessment was put on their interests in the Daggafontein Gold Mining Company; in other words, that they must not be bound to supply any funds. He thought that they, as directors, had guarded that point. When the negotiations were begun in June, or before that date, the Daggafontein shares were standing at 5s. or so in the market. They all knew what the price was at the present time. It did not matter whether they had a share of £1, which stood at 5s. or a share of 5s. It was much better that their shares should stand at a premium in the market than be at a discount. Therefore, although under the scheme they were to get one for three, he did not look upon that as a loss at all. As the Chairman had put it, it was only an apparent loss. As shareholders he thought they could wish themselves the compliments of the season, and also congratulate themselves on the fact that they were within sight of the Daggafontein mine being brought to the producing stage.

The resolution was carried unanimously.

The retiring director (Mr. Roger C. Richards) was re-elected, and Mr. T. C. Haward was reappointed auditor.

The proceedings then terminated.

WANKIE COLLIERY.

PROGRESS OF THE UNDERTAKING

Dividend of 7½ p.c. for 8 Months.

The first ordinary general meeting of the Wankie Colliery Co., Ltd., was held on December 21st, at Salisbury House, London Wall, E.C., Mr. Edmund Davis (the chairman) presiding.

The Chairman said: On December 8, 1914, we presented accounts for the twelve months ended August 31 of that year. Since then the scheme relating to replacements of capital has been carried out, the present company registered on December 28, 1914, and the accounts now presented made up to August 31, 1915—that is, a period of eight months. The shareholders in the old company were allotted 810,466 shares of 10s. each, that is, £405,233 in lieu of 405,233 shares of 10s. in the old company, and seven shares were issued for cash to the subscribers to the memorandum and articles of association. At August 31, 1914, the old company had outstanding £100,000 6 per cent. first mortgage debentures, but of these £7,000 were paid off on December 31 last. The present company has issued debentures of equal value in exchange for those in existence in the old company; therefore £93,000 appears under this heading in the balance-sheet, and of this amount £7,000 has been drawn for repayment on the 31st instant. The next item in the accounts is London creditors £9,699 12s. 5d., which has since been practically all paid off with the exception of a small amount on two contracts and a reserve for income-tax. South African creditors amount to £20,307 14s. 4d. These with the exception of £15,096 due to the railways, were ordinary trade accounts in the colony. The railage account has since been paid, and we have no doubt that the other accounts have been settled since the date of the accounts.

The Balance Sheet.

The remaining item on this side of the balance-sheet is the balance profit for the eight months ended August 31, 1915, £36,194 11s. This compares with £56,236 13s. for the previous twelve months. For the purpose of comparison we must reckon on a profit for twelve months at the same rate, that is, £54,291, or a reduction of about £2,000, the whole of this difference being practically due to the larger amount payable by way of interest on debentures, which in the present accounts—that is, for a period of eight months—amounts to £3,737, or at the rate of £5,580 per annum, comparing with £3,796 for the twelve months ended August 31, 1914. Turning to the other side of the accounts, it is, of course, impossible to make any comparison with the figures appearing in our balance-sheet at August 31, 1914, owing to allocation of capital on the formation of the present company; but it is satisfactory to note the strong position of the company at the date of the accounts, when cash and debtors amounted to £51,268. We have set out in the report the full twelve months' operations of the company so far as sales of coal and coke are concerned, so that you should realise what progress is being made. For the twelve months ended August 31, 1915, we sold 267,205 tons of coal, comparing with 239,969 for the twelve months ended August 31, 1914, that is, an increase of 27,236 tons, and in coke the sales for twelve months to August 31, 1915, amounted to 31,591 tons, comparing with 17,272 for the 12 months ended August 31, 1914, an increase of 14,319 tons. The question of increase in sales for the period ending August 31 next depends upon the delivery of plant, as our large contract with the Union Miniere du Haut Katanga, which has been referred to on previous occasions, comes into operation on January 1 next. From then the Union Miniere du Haut Katanga has to take 100,000 tons of fuel per annum,, of which not less than 40,000 tons are to be coke, that is, about 3,300 tons of coke a month, which means an increase in our coke sales at the rate of about 22,000 tons per annum. Previous to the outbreak of war we ordered a coking plant very similar to the one erected by the Union Miniere du Haut Katanga in the Congo, but, unfortunately, deliveries of part of the plant have not been made, though we understand it has been lying for some time at Antwerp. Under these circumstances, desiring to do all we could so as to meet the requirements of the Union Miniere du Haut Katanga, we placed duplicate orders in this country for the portion of the plant not available, and though we have continually pressed for delivery, we have not yet met with success. If we are able to complete our coking plant at an early date, then coke in larger quantities will be supplied to the Union Miniere du Haut Katanga, and in return copper in larger quantities should be produced and the copper sold to English smelters. It is of great importance to our country that supplies of metal should be made available, and therefore it must be in the Governments interest that no delay should occur in the delivery of the small quantity of plant we still require.

Coal Prices.

As far as prices of coal are concerned, we supply large coal at 9s. per ton for all supplies as far as Norton Siding—that is, 488 miles from the colliery, and 8s. 6d. per ton beyond. Nuts we supply at 7s. 6d. per ton, these prices being exclusive of railage, and we think that you will agree, and our consumers realise, that the prices being charged are reasonable, and compare very favourably with the cost on trucks of similar coal in most parts of the world. As regards profits, you will have received on the payment of the dividend we are recommending to-day 7½ per cent. for the eight months ended August 31, 1915, and you have also received 5 per cent. from the liquidator of the old company for the four months ended December 28, 1914, making a total return of 12½ per cent. for the year on your capital as at present replaced; but this is not a very large return on the present price of our shares, and we think you are entitled to expect dividends at an increased rate so soon as our coking plant is erected. As far as business for the current year is concerned, the sale for September, October, and November are: Coal, 26,928, 27,544 and 28,057 tons respectively; coke, 2,862, 2,162 and 2,182 tons respectively—that is, 82,529 tons of coal, comparing with 65,219 tons for the same months of 1914, and 7,206 tons of coke, compared with 8,085 tons for the same period in 1914, or a large increase of 17,310 tons in the sale of coal and a small decrease of 879 tons in the sales of coke. There is only one other matter to which reference need be made at this meeting, and that is the directors' remuneration referred to in the report, in which we state that there is to be deducted the sum of £1,134 6s. 8d. in respect of directors' additional remuneration. Since the issue of the report and accounts, we have decided that the maximum of £1,500 per annum, payable by way of additional remuneration to members of the board, should apply to a full financial year, and that the accounts being for a period of eight months the maximum payable should be £1,000, which means a saving of £134 6s. 8d. to the company. Since our last meeting there have been great improvements in the equipment of the colliery, for which purpose capital was provided a short time back, when the debenture issue of the old company was raised from £60,000 to £100,000, and we now wish to place on record that a great deal of credit is due to our general manager (Mr. Thomson) and his efficient staff, not only for the way capital has been expended to the best advantage, but also for the manner in which the operations of the company have been carried on for the last twelve months, and, at the same time, we wish to state that, though some of those on the colliery may have had to undertake additional work, we all understand and appreciate the patriotic spirit which has induced other members of our staff to join His Majesty's Forces. May good luck go with them! (Applause.) I now beg to move: "That the directors' report and statement of accounts as at August 31, 1915, submitted to this meeting, be, and the same are hereby approved and adopted," and previous to putting the resolution I shall be very pleased to answer any questions you may wish to address to the chair.

Mr. D. N. Shaw seconded the resolution.

Questions and Replies.

Mr. Litchfield: I would like to know how it is that with such a large increase in the sales of coal and coke we have only the same dividend and a less carry-forward. I should also like to ask whether the accounts for September, October, November and December, 1914, which comprise one-third of the year, have been audited by the auditors the same as the last eight months. I may say that owing to the courtesy of our secretary I have seen the statements, but I do not think that we should be called together to consider the affairs of the mine for a year and only have eight months accounts before us.

The Chairman: I quite agree with the shareholder who has just spoken that it is somewhat difficult to compare the position of the company's operations for the period which has elapsed—that is, to August 31, 1915—when he has before him the accounts for the twelve months which ended on August 31, 1914. If the position is difficult you must attribute it to the members of the board, who thought that you would prefer to have accounts made up to August 31, 1915, covering a period of eight months, and receive your dividend at a much earlier date, instead of leaving us to make up the accounts for the full year's operations, and only receive your dividend in April or May next. As far as the four months' operations of the old company are concerned, those accounts were duly audited, and you received by way of distribution what you might consider a dividend in the present company, as it was a distribution of 5 per cent., and, therefore, you have, as the shareholder justly remarked, received the same rate of dividend as in the previous year. The difficulty the shareholders naturally have, when considering these different sets of figures, is that in the previous accounts you had profits amounting to £56,236 13s. that was for the twelve months ended August 31, 1914—but in the present accounts, which are for eight months, you have profits amounting to £36,194, which for a full period of twelve months, at the same rate, is equivalent to £54,291. The only difference between the operations in the two years is practically a difference of interest on the amount of debentures outstanding, as the interest payable during these eight months is at a larger rate per annum than it was in the previous accounts. The profits for the two periods are practically the same, although the sales have been larger; but the question of profits does not depend upon the tonnage sold—it depends upon the qualities of the coal sold, and the profits made on those respective qualities. I think you will agree that the distribution is satisfactory, and I hope you will remain content with the statement I have made, namely, that we have no doubt that, given the completion of our coking plant, the profits in the future will be even larger than in the past, and we hope that those profits will be distributed among the shareholders, as we consider you should receive a greater return on the present price of the shares than you are now getting from the distribution of the dividends we are now recommending.

The resolution was carried unanimously.

Dividend Recommendation.

The Chairman: I have now to move: "That the interim dividend of 5 per cent. on the shares of the company paid on May 31, 1915, be confirmed, and that a further dividend of 2½ per cent. be paid, making a total dividend of 7½ per cent. for the eight months ended August 31, 1915."

ENTERPRISE GOLD MINING.

POSITION AND PROSPECTS OF COMPANY'S VARIOUS INTERESTS.

The ordinary general meeting of the shareholders of the Enterprise Gold Mining and Estates Co., Ltd., was held on December 22nd at the City Terminus Hotel, Cannon Street, London, E.C., Mr. Samuel Weil (the chairman) presiding.

The Chairman said: I must apologise for the absence of Major the Hon. Charles J. White, who is serving his country at the front. I also have, unfortunately, to announce the very sad news, which reached me just before coming to this meeting, of the demise of Mr. Bourchier Hawksley, our legal adviser. All who have had the privilege of knowing Mr. Hawksley will know what a blank his death means to this community, and especially to Rhodesia, which I may almost say was engraven upon his heart. Mr. Hawksley's advice was invaluable to all who came in contact with him, and I am sure you will share with me the deep regret we all feel. (Hear, hear.) I presume that you wish the usual course taken in connection with the report and accounts, and, with your permission, we will consider same as read. I propose dealing first of all briefly with the accounts, and follow with a few explanations where necessary. Turning, first of all, to the balance-sheet, on the asset side, the first item I would draw your attention to is property and outlay. This, as you will notice, has increased from £64,114 to £75,468. This increase is almost entirely due to the acquisition of the Cam-Good Shepherd interest, and in this total figure is, of course, included our Radnor interest and our various mining claims, including development expenditure to date. Investments at cost have increased from £133,318 to £141,941. This increase is due to the fact that when taking up the Cam-Good Shepherd interest we also obtained a proportion of the debentures issued by the Cam and Motor Co. This we considered sound policy, as not only do they carry interest at 7 per cent., secured on the whole property of the company, but by taking up these debentures we were able to obtain an interest in a call on 100,000 shares in the Cam and Motor Gold Mining Co., Ltd., at par, less 10 per cent., to the extent of 11,000 shares. This debenture investment the board regard as being of importance, seeing that it carries this option, and I believe in this opinion shareholders will concur. Personally, I look to making a nice profit out of this call.

Valuation of Investments.

In dealing with the item of investments at cost, you will notice we have omitted the usual statement dealing with valuations, and I am sure, in view of market conditions, you will agree with me that it is practically impossible to make any valuations. Some of the shares are quoted on the Stock Exchange, but the prices are purely nominal, and I might say that to deal in most mining shares to-day is a matter of negotiation. You will, therefore, understand how very difficult it was for us to arrive at any basis of valuation. They stand, however, on our books in some cases at cost and in others below cost, where we have written shares down in past years. I doubt whether any company to-day with share assets, and particularly mining share assets, would be able to realise any of its holdings in the present condition of the markets without considerable sacrifice. The board, therefore, have not been able to take upon themselves the onus of making a valuation; but they are of opinion that the value of their share assets is much beyond the market prices of today. Debtors and cash, which last year stood at some £39,000, stand this year at approximately £14,000. This decrease is, of course, due to the acquisition of the interests I have referred to. Turning to the other side of the balance-sheet, sundry creditors, you will note, are down by some £5,000, while the other items call for no comment on my part. Referring to the profit and loss account, the figures before you require no explanation on my part, beyond that you will notice that we have been able to reduce our expenditure. London expenses are down by some £300, and South Africa also shows reduction, while, on the other side, you will notice that the item "mining revenue and profits" appears for the first time, and we hope to see this figure increase in the future.

Cam and Motor.

Dealing now with our various share interests, the Cam and Motor is one of our largest. From the report and proceedings of the Cam and Motor Co., there is every reason to believe that the dividend-paying stage will be entered into during the current year, which will naturally be materially to the advantage of the position of this company. They have surmounted the treatment troubles, and the extraction as originally estimated has been obtained. Owing, unfortunately, to the war, however, the best results in respect to tonnage have not been obtained, and profits have also been affected by shortage of white labour—owing to many of the company's employees having joined the forces—and the increased cost of stores and all mining requisites.

The Giant Co. have published their report, and the many difficulties they have had to encounter during the year are referred to therein. The tonnage put through their mill is only about half of what it was the previous year, this being entirely due to the enormous falls of country rock and the difficulties of working arising therefrom which has affected the profits. No success has yet been met with in connection with the recovery of the misplaced lode at the bottom of the mine, but work in this direction is still proceeding, the company is still working at a profit, and the manager of the company (Mr. Allwright), whom I had the pleasure of meeting several times during his short holiday spent here, sees no reason why the Giant Co. should not continue to work at a profit for some time to come. The Giant Co., as you know, is also interested in the Cam-Good Shepherd property, to which I will refer later.

With regard to the New Found Out Mines, Ltd., the directors are advised that the solution in respect to treatment has been solved, but, unfortunately, owing to the condition of affairs, it is impossible for them to arrange for the finance. Recently, however, a scheme was placed before the Treasury officials, to which they would not give consent. We are, however, reconsidering the position, and I am hopeful of an arrangement being fixed up within a very short time, and trust the New Found Out Co. will then be in a position to make an announcement to their shareholders. If some satisfactory scheme can be arranged, we shall be receiving, I hope, substantial reductions in regard to the advances made by us, and in due course a distribution of profits. The money advanced by us during the last year has been for upkeep and maintenance, and we, as the only creditors, are therefore in a position of security.

The Farm Lands of Rhodesia, Ltd., in which you are largely interested, has had rather a serious set-back this year, due to the outbreak of sickness on their principal ranch. The latest reports show that the mortality has ceased, and that the cattle are all in healthy condition. Every precaution has been adopted to prevent a recurrence of the outbreak, and we trust that that company will have a better report to lay before us during the coming year.

Cam-Good Shepherd.

Dealing now with our mining interests, the most important of these is now in the Cam-Good Shepherd mine. I am very pleased to be able to report that this mine is opening up exceedingly well, and from the consulting engineer's report you will see that the development work carried out has been very satisfactory in its results. At the 5th level, at a depth of approximately 500 feet, we have now driven on the lode for a total distance of 556 feet, which is in itself a considerable length of pay-shute, and we have by no means exhausted the possibilities at that depth. The drive is proceeding in an easterly direction towards the Eileen Alannah boundary, and should present values continue to the extent of the shute yet to be explored, viz., about 1,200 feet, it is obvious that the value of the property will be greatly enhanced. This does not by any means exhaust the possibilities at depth of the property, as no work has yet been done below the 500 feet mentioned. We look upon this interest as being most important, and believe that the deal entered into will prove highly profitable to this company.

I must tell you that at present no financial scheme has been entered into for bringing the property to the producing stage. Those who are jointly interested with us rightly regard that these are not suitable times to erect plant and machinery, which, owing to the war, would cost at least 30 per cent. more than in normal times. Again, to finance the undertaking, we should have to obtain the sanction of the Treasury, which no doubt would not be forthcoming. Meanwhile, development of the property will be continued, thus adding to the tonnage, which at June 30th last stood at the respectable figure of 124,087 tons, of a total value of £273,168, and since that date this figure has been added to.

Radnor Mine.—In this you have a comparatively small interest. Crushing has been going on steadily during the year. Unfortunately, the ore body is a short one, although it gives every sign of going down well in depth. It is possible we shall have at depth a longer shute to work on, and, if so, larger profits would result. However, it is early yet to say much on this, as the property is really in its infancy. The new main shaft which is going down has reached a depth of 216 feet, and it will be very interesting to see the condition of the lode when the main shaft reaches the proposed depth of 600 feet; meanwhile, satisfactory profits are being made.

No work has been done on our other properties during the year, beyond a certain footage for protection purposes, and we do not feel at the present time justified in launching out in this direction.

The Year's Results.

Dealing with the position covering the financial year, shareholders are probably disappointed at the results, but our inability to improve on them has been entirely due to the unfavourable conditions during the period. It has been absolutely impossible to make profits out of share dealings, as we have not been able to dispose of any shares at a price that would be satisfactory, but we have endeavoured to make ends meet. We have been fortunate in securing what the board regard as a very valuable option in respect of the Cam and Motor shares, and also completing the purchase of the Cam-Good Shepherd interest. So soon as the Cam and Motor Co. commence to pay dividends, and I think this will happen before the close of the present financial year, and so soon as the New Found Out Mines are brought to a producing stage, we should then be in receipt of a substantial revenue, and, possibly, be able to resume distributions to the shareholders. I now beg to move: "That the report of the directors, together with the annexed statement of the company's accounts to June 30th, 1915, be received and adopted." After my colleague, Mr. Herbert de la Rue, has seconded the resolution, I shall only be too pleased to answer any questions which any of you might care to put to me.

Mr. H. de la Rue seconded the motion, which was carried without discussion.

Mr. De la Rue: I beg to propose: "That Mr. Julius Weil (the retiring director) be, and he is hereby, re-elected a director of the company."

The resolution was seconded by the Chairman and carried unanimously.

On the motion of Major Shannon, Messrs. Fuller, Wise, Kirby and Fisher were reappointed auditors of the company.

The proceedings then terminated.

CAPE COPPER COMPANY, LTD.

The twenty-eighth ordinary general meeting was held on December 15 at Cannon Street Hotel, E.C., Mr. T. Blair Reynolds (the Chairman) presiding.

The Chairman, in moving the adoption of the report and accounts, said that the working profit for the past year was £33,212, as compared with £17,244 in the previous year. The receipts from copper ores and metal, £105,234, were practically the same in both years. In the balance-sheet the Briton Ferry smelting works account showed £15,000 to have been spent during the year, and he was glad to think they were near the end of capital expenditure there. Under the head of the Rakha Hills Mines there was an increase of about £67,000, which included the permanent mine plant which had been installed during the year. An examination of the year's work, resulting in the payment of Preference interest and a modest dividend of 1s. per share on the Ordinary shares, showed conclusively that the Company had not made any of the so-called war profits. Referring to the Cape mines, he said that at Nababeep the estimated reserves—160,000 tons of 5 per cent. ore—were the same as at the end of the previous year, although about 48,000 tons were extracted from the underground workings. The old O'okiep mine, from which the bulk of the Company's profits in the past had been derived, was showing constantly diminishing returns, and to make good the declining profit therefrom they must now look to the Rakha Hill Mines in India. In Rakha they had a mine of considerable proved and prospective value. They had at the end of August ore reserves of 345,000 tons, showing an assay value of 4 per cent., on a gross copper content of nearly 14,000 short tons. The mine was provided with a complete electrically-driven equipment and a concentrating plant to deal with a mine output of 300 tons a day. The quantity of ore in sight thoroughly justified the starting of the reduction plant. The directors were disappointed that the Rakha Hills Mines were not producing to-day. By carrying the reduction process a stage further in India—that was by smelting the concentrates there—the product would be of higher grade, the same copper being contained in a less weight of material, and so freight would be saved. By the use of a smelter at Rakha they were advised that they would make a material profit even under present conditions, and, therefore, when the freight problem became serious the smelter was ordered. They were told that it ought to be working in six months. He mentioned that period under present conditions with all reserve, but he did hope refined copper from Rakha would have been sold when they next met the shareholders, and that thus the new era in the Company's affairs, for which the directors had for a long time worked and the shareholders had paid, would be inaugurated.

Mr. John E. Champney seconded the motion, which was carried unanimously.

FRANK SMITH DIAMOND.

ACCUMULATION OF DIAMONDS IS REALISING SATISFACTORY PRICES.

The ordinary general meeting of the Frank Smith Diamond Estates and Exploration Company, Ltd., was held on December 17th, at Winchester House, Old Broad Street, E.C., Mr. E. Turk (deputy-chairman) presiding).

Mr. T. Honey (the representative of the secretaries, Johannesburg Consolidated Investment Co., Ltd.) having read the notice convening the meeting and the report of the auditors,

The Chairman said: In proposing the adoption of the directors' report and accounts I have to add only little to what has already been stated in the report. Operations at the mine were stopped soon after the outbreak of the war, and the property has since remained in charge of one of the company's employes. Three of our directors, who are resident in Johannesburg, act as a local committee, and exercise the necessary supervision. When we had to suspend operations we found ourselves in a financial position which caused the board some anxiety. Owing to the bad state of the diamond market during the six months preceding the war we had accumulated a considerable proportion of our production, against which we had received advances. At this time last year the total of the advances, which had been made to us either against diamonds or on the general security of our assets, backed by a guarantee of our two principal shareholders, totalled over £75,000, and at our meeting of shareholders a year ago we had to increase the borrowing powers of the directors to £100,000 to enable us to deal with possible contingencies. I am glad to be able to present to you to-day a much brighter picture. During the last few months the market for certain classes of diamonds has considerably improved, and this has enabled us to dispose of most of our accumulation, and the balance that remains we have little doubt we shall presently be able to realise. The effect of this has been that the advances I have referred to are now reduced to about £35,000, and we reckon that the realisation of the balance of our diamonds will bring them down to less than £25,000.

Question of Claim Licences.

In the early part of this year we were faced with the necessity of providing funds for the maintenance and upkeep of our properties. Thanks to the assistance of our principal shareholders, we were able to arrange for an amount which provided for all immediate needs, and will, we trust, be sufficient to meet all our ordinary outgoings for the coming year. We have, I believe, done everything that it has been possible to do to reduce expenditure. Our administration expenses are at a more or less nominal figure, but the chief item of our expenditure is in respect of claim licenses payable to the South African Government. This item figures in the accounts which you have before you for an amount of £1,875. At the beginning of the war we approached the authorities in South Africa in an endeavour to obtain some reduction, or other alleviation of this burden, but we have not been successful, and we have now taken steps to adjust the boundaries of our claim areas, and hope in this way to obtain some slight relief. The revenue which our farms are yielding us (and you will not doubt remember they comprise over 41,000 acres) provides a small fund available for general expenditure. Steps have been taken to try and increase the revenue from this source.

Results of Recent Investigations.

Some little time ago we gave instructions to investigate certain localities on these farms, where we understood good indications of mineralisation exist. The news received during the last few weeks shows that at certainly one point diamondiferous ground has been met with. The work is being carried on in a small way, with a few natives, and at very little expenditure, and it will therefore take some time to establish the extent of the occurrence. It is premature at the moment to discuss what action will be possible in the future to restart operations; but let me remind you that our mine is opened up for practically immediate production, and that our plant, which to all intents and purposes is a new one, will require comparatively small further adjustments to bring it into operation again. Let me also recall to your mind that during the last few months of work prior to closing down our working costs had come down from 3s. 9d. per load to 2s. per load, and that when we closed down we had reached the point when revenue met working expenditure, and that we were within sight of making regular profits. I have much pleasure in proposing the adoption of the report and accounts.

Mr. A. R. Stephenson seconded the motion, which was carried unanimously.

On the motion of the Chairman, seconded by Mr. A. A. Knight, Messrs. G. Imroth and G. Sonn were re-elected directors.

Messrs. Cooper Brothers and Co. were reappointed auditors, and the proceedings terminated.

JOHANNESBURG GOLD FIELDS.

DEPRECIATION IN MARKET VALUE OF SECURITIES.

The fifth ordinary general meeting of the Johannesburg Gold Fields, Ltd., was held on December 13, at Winchester House, Old Broad Street, E.C., Mr. P. G. Hamilton Carvill (Chairman of the Company) presiding.

The Chairman said: Gentlemen,—I do not think I need detain you very long with a detailed resume of the company's operations during the year under review. It would be more or less a repetition of my remarks on this occasion last year. In fact, the term "operations" which I have just used hardly represents the case, as we are still in the quiescent position of having certain assets, the development of which is not dependent upon our own activities. Our investments in shares and debentures in other companies remain practically the same as at the end of the previous year, but, unfortunately, a further depreciation in the market value of a little over £6,000 has to be recorded. This results mainly from a further slight drop in the price of Cinderella Consolidated. My remarks of last year apply equally well this year in regard to the position of that mine and its prospects for the future. We are still waiting the advent of more propitious times so as to admit of the necessary additional capital being procured for the purpose of developing the property on the large scale justified by its enormous size and potentialities as an important gold producer on a reasonable basis of working costs.

Cause of the Reduction of Revenue.

The reduced revenue of about £1,000 is due almost entirely to the postponement by the Cinderella Consolidated of Debenture interest payments—a matter to which I referred in my remarks of last year. As a small set-off one of our other investments—our holding in the New Goch Gold Mines, Ltd.—has entered the dividend-paying stage. As regards expenditure, this shows a slight increase, though a portion of it is not actual. That is to say, the item of income-tax was formerly deducted from the revenue, whereas this year it is shown as an item of expenditure, and is, of course, considerably larger than in previous years. A larger sum has been spent in Africa on our tree plantation, but against this you will notice that for the current year the fees payable to the directors have been reduced by one-half, and now represents only a nominal amount. Office rent and general charges have also been reduced by nearly £100 to the low figure of £255. The profit for the year, representing the excess of revenue over expenditure, is £2,379, which has been added to the amount brought forward from 1914. I have nothing further to add, gentlemen, except to formally move the adoption of the directors' report and accounts, and I will ask Mr. Fraudenthal to second the motion. I shall then be pleased to answer any questions on the report and accounts which any shareholder may have to put.

Mr. Jacob Freudenthal seconded the motion, which was carried unanimously.

The retiring director (Sir Frederick Frankland, Bart.) and the auditors (Messrs. Cooper Bros. and Co.) having been re-elected, the meeting terminatd with a vote of thanks to the Chairman and directors

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CONTENTS. PAGE

Notes and News ... 503
Topics of the Week:
- Far East Rand Developments ... 505
- The Projected Diamond Merger ... 505
- Rand Capital, Dividends and Profits Tax ... 506

Union Coal and Base Metals in 1915 ... 507
Antimony in South Africa ... 508
Some Features of the Rand Gold Mining Industry—II. 509
Rand Metallurgical Practice—II. ... 511
Progress on Albu Mines ... 512
S.-W. Transvaal Diamonds: December Output ... 513
Electrolytic Precipitation of Gold, Silver, and Copper from Cyanide Solution—IV. ... 514
New Coal-Dust Experiments—IV. ... 515
Imperial Trade ... 516
Correspondence and Discussion: " The Karroo Coal Controversy "; " Unhealthy Conditions in the Mines of the Rand, and the Effect on Working Costs " ... 517
The Week in the Mining Material and Engineering Trades ... 519
The Week in the Sharemarket ... 521
Engineering Notes and News ... 522

Notes and News.

Brakpan Ore Reserves. The following cable has been sent to the London office of the Brakpan Mines, Ltd.:—" The annual re-calculation of the payable ore reserves shows a total of 3,017,000 tons of an average assay value of 7·86 dwts. per ton over an estimated stoping width of 62 inches. Compared with ore reserve a year ago, this is an increase of 527,000 tons, the average value being 1·13 dwts. per ton higher, over the same estimated stoping width." This splendid showing, combined with the fact that the working profit for 1915 was £346,760 as compared with £282,222 for 1914, has considerably enhanced the position and prospects of this great Far East Rand producer.

* * * *

The Robinson Group. The annual meetings of the Robinson group of companies will be held on Monday next at Mayfair, when it is to be expected that the brief statement regarding operations in 1915 will be elaborated. That statement, it will be remembered, was prepared before the returns for December were available. Interest attaches to the explanation of the new system of working at Randfontein, which will doubtless be given by the chairman.

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Rand Mines Dividends. The directors of Rand Mines, Ltd., have decided that, owing to the irregularity of the present mail service, the dividends declared by the following companies on 14th December, 1915, will not be posted before 10th February, 1916: Modderfontein B. Gold Mines, Ltd., New Modderfontein G.M. Co., Ltd., Rose Deep, Ltd., Geldenhuis Deep, Ltd., Nourse Mines, Ltd., City Deep, Ltd., Village Deep, Ltd., Robinson G.M. Co., Ltd., Crown Mines, Ltd., Durban Roodepoort Deep, Ltd.

* * * *

Rhodesian Record Gold Output. The Rhodesian gold output for December was declared this week at 79,106 ozs., value £331,376, an increase over November of 4,230 ozs., value £18,216. Matabeleland contributed 36,809 ozs., value £154,456; and Mashonaland 42,297 ozs., value £176,920. The total output for 1915 was valued at £3,823,163, as compared with £3,580,209 for 1914, £2,903,267 for 1913, and £2,707,368 for 1912. Indeed, the Rhodesian output for 1915 is easily a record for the territory. Full details will appear in our next issue.

* * * *

Double Income Tax. According to Reuter, South Africans, individuals as well as companies, are heartily co-operating in the crusade of the Dominions against the double income tax. One example of the unfairness of the imposition is the case of a high Union official, whose services were loaned and whose home and family are in Pretoria. He pays double income tax. The latest suggestion is an inter-Imperial arrangement, whereby only single income tax will be paid, and equally divided between the Imperial Government and the Dominions.

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Antimony. In view of the price of antimony, which before the war ruled at £30 per ton, but is now difficult to obtain at £125 per ton, according to Reuter, it is pointed out that the Murchison Range in the Transvaal is believed to be distinctly rich in antimony ore, and that South Africa has not yet been scratched as regards base metals. The moment is considered opportune for the Union Government to take the initiative in developing known deposits. The shipping of South African antimony ore to Britain would be beneficial both to the Union and the British taxpayer.

Earth Tremors Commission. As we recently announced, the Earth Tremors Commission will shortly issue its report. The findings of the Commission follow the general line of evidence offered. The Commission is of opinion that the shocks are incidental to subterranean excavations for mining purposes, and though they can never be wholly eliminated, they can be minimised considerably by the effective filling of worked-out stopes, pockets, passages, and other excavations with sand or concrete. This filling up the Commission recommends. It is believed the Government is prepared to give legislative effect to the findings of the Commission.

* * * *

Stella Diamonds. The latest thing in diamond company promotions to adorn the Stock Exchange list is the venture known by the name of "The Stella Diamond Mining Company, Ltd." The nominal capital is £20,000 in £1 shares, and the directors are Messrs. W. P. Johnstone, M.D., J.P., James Ross, L. C. Reck, and C. A. Lageson. The company has been registered to take over the vendor's right, etc., to a contract relating to the prospecting and purchase of some 425 morgen of the farm Rietfontein No. 501, district Pretoria. The name of the vendor is not disclosed. It is stated that a mine has actually been opened up, and proved to carry from 10 to 12 carats per 100 loads, and that the size of the mine so far proved is about 100 claims. It is said to lie on a direct line of fracture to the Premier Mine, but nothing is said as to its possible relationship with the National Diamond Mine, which is on the same farm. It is not clearly stated in the prospectus how many loads have been treated altogether, but about 600 loads are accounted for, and on this basis there are said to be more than 1,200,000 loads available down to the 200 feet level, "which should yield over 120,000 carats of diamonds." As a matter of fact, we understand from other sources that the Stella Mine is the old Schuller Mine No. 2 under a new name. The No. 2 mine is that part of the old National Diamond Syndicate's property which adjoins the Kaalfontein boundary, and has been worked to a considerable extent by that syndicate, together with the No. 1 mine which lies a few hundred yards to the west of it. In the circumstances it would seem desirable that some explanation should be given of the fact that all reference to the work of the National Diamonds, as such, seems to have been studiously avoided. The operations of that syndicate are said to have been a failure, generally speaking, and for that reason, among others, the late owners are supposed to have been compelled to abandon their property. In view of the whole past history of the Schuller, alias National Diamonds, alias, it would also seem, Stella Diamonds, the prospectus issued by the promoters of the new undertaking is somewhat incomplete. To put the matter shortly, the public are justified in asking why the National Diamond Mine No. 2 is "a soundly payable one" under the new arrangement.

* * * *

The Nigel. The following cablegram has been sent to London for the information of Nigel shareholders:—"New shoot now proved in 14th and 22nd levels, good reef, payable values. Development proceeding vigorously. Sinking incline shaft simultaneously. Monthly loss will continue until shoot sufficiently opened up for stoping."

* * * *

Enemy Trading Bill. The latest Enemy Trading Bill to be introduced in the Imperial Parliament is of a most drastic nature. It provides that the Board of Trade may stop any business belonging to a firm carrying on trade wholly or mainly for the benefit of, or controlled by, enemies, whether here or in enemy countries, and also, take over any German patent. The inspectors may examine any business for the purpose of ascertaining whether it is controlled by or benefiting any enemy. The Registrar of Companies may refuse to register a company if one of the subscribers to the memorandum of association, or a proposed director, is an enemy. Shares cannot be transferred to or for the benefit of an enemy. Any company registered in London, and doing outside the United Kingdom business which, if done in the United Kingdom, would be trading with the enemy, may be wound up. The restrictions contained in the Bill operate not only during the war, but until removed by Order-in-Council.

* * * *

Copper for Germany. In the course of an article in the London *Daily Mail*, Mr. Lovat Fraser points out that by obtaining free access to Constantinople Germany will not only be able to replenish her stocks of cotton and corn to some extent, but what is equally important, will be enabled to secure the very necessary supplies of copper. In the heart of Asia Minor, near Diarbekr, and in close proximity to the Bagdad railway, there are a number of promising copper deposits. The principal mine, which is equipped with a smelting plant, is the Arghana Maaden. The output of the mines has averaged about 1,500 tons fine copper per annum for some years past, but could doubtless be increased with modern methods and equipment.

* * * *

The Mines, the Farmers' Mecca. Those of the backveld who incline to the opinion that the mining industry is not doing enough for the country, even in contributing 10 per cent. of its profits directly to the purposes of the Government and indirectly to the relief of the agricultural interest, should ponder upon the vast figures relating to the sales upon the Johannesburg Municipal Market which have recently been supplied by that department. The total amount realised during 1915 from sales, including fruit, but excluding vegetables, was £657,402, the receipts for vegetables adding another globular £90,000 to the total revenue. These figures do not take into account the large quantities of mealies and other produce which are supplied by contract to the mines, nor the immense tonnage of South African grown meat which is sent to the Rand from all parts of the country.

* * * *

Swazieland Corporation. The report of the Swazieland Corporation, Ltd., for the twelve months ended 30th September, 1915, states that, owing to lack of funds, no mining operations have taken place during the year under review. Efforts have been made to let some of the properties on tribute, but, unfortunately, without result. These efforts are being continued, but at the present time Swazieland does not appear to offer sufficient attractions to the class of tributors to whom the directors would care to entrust the property. No opportunity has arisen during the year to deal with the corporation's land, and the manager reports that there is little likelihood of any development in this direction pending the conclusion of hostilities. Rentals received during the period under review amounted to £296. The profit and loss account shows a debit balance of £1,995, as compared with £2,790 for the previous financial year.

* * * *

Anglo-French Exploration. The secretary of the Anglo-French Exploration Company, Limited and Reduced, has issued the following circular to the holders of Preference shares:—"You are aware that the directors' proposals for dealing with the Preference capital were carried by large majorities of both classes of shareholders at the meetings held in September and October last. I am instructed to inform you that since then considerable progress has been made, but owing to the many legal formalities involved it will take somewhat longer to complete than was anticipated. The directors are now advised by their solicitors that the matter cannot come finally before the Court until about the end of February next. The scheme of arrangement to which the Court's sanction is being asked provides for the cancellation of the Preference capital as on the 30th of June last and consequently the directors cannot declare the usual half-yearly dividend on the 31st instant. The scheme provides that shareholders are to receive interest at the rate of 4½ per cent. per annum as from the 1st of July last on the cash to be paid and debentures to be allotted to them in exchange for their shares, but the directors are advised that they cannot legally pay any interest until the scheme has in fact gone through. When the matter is completed shareholders will receive interest from 1st July up to the date of such completion, together with that portion of the capital repayable in cash."

* * * *

A Valuable Work.

A new edition of "The Metallurgy of Gold," by Sir Thomas Rose, D.Sc. (London: Charles Griffin & Company, Ltd., Exeter Street, Strand, W.C., price 22s. 6d. net) has been issued. This work is now in its sixth edition, and has been considerably expanded and revised in keeping with recent developments of practice. The volume is larger than formerly and comprises about 600 pages, including 223 illustrations. The author has given an excellent account of the extraction of gold from its ores and of its adaptation for use, but he has also given much information which will be valuable to those engaged in the work and who are attempting to improve existing practice. Comprehensive and accurate information as to the properties of gold, its alloys and compounds, and of the bearing of these on the work to be done, is presented, and a summary of the general position in the working of placers, ore dressing, stamp milling and the cyanide process is given. An extremely valuable chapter deals with the refining of gold and assaying, and considerable care has been devoted to a discussion of the electrolytic processes of refining. In general more attention has been paid to the principles underlying the practices discussed than to the details of the apparatus employed, although a lot of useful information is given on that matter too, and a number of typical machines are described. The volume may be accepted as a really valuable one to all those who are engaged in gold mining and working.

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Diamonds in British Guiana.

Holders of diamond claims in British Guiana are not having the best of times just at present. The closing of the market in Europe left no avenue for the disposal of stones recovered. In addition, the Government has increased the claim rental, and also the royalty. In the past diamonds have not contributed to the revenue in the same proportion to value as gold, but even allowing for this holders claim that to raise the rental now from $5 to $14 per claim is a distinctly unwise step. Export of diamonds is prohibited save through two local banks. The Council of the Institute of Mines and Forests remarks that there are only two channels for shipping diamonds "except by special permission of his Excellency the Governor. This latter condition does not recommend itself to the investment of capital." It is suggested that as one shipping medium is the agent of certain diamond merchants, the smaller producers are compelled to accept such value as the merchants put upon the stones. This causes much dissatisfaction. For the twelve months ended June 30 the caratage was 10,980, against 12,506 for 1914.

* * * *

The Industrial Commission.

The Council of the South African Institute of Electrical Engineers has carefully considered how best the Institute may serve this Commission, and has decided to place at the disposal of the Commission the information and data recently collected and worked up by the Development of Resources Committee of this Institute. It is appreciated that time is an important factor and the Development of Resources Committee is therefore hastening the completion of its report, and has been asked in so doing to frame the report to suit the requirements of the Commission. The Committee has arrived at the conclusion that there is a most promising field for the development of electro-chemical industries in this country, and more especially in the direction of the production of the various nitrogenous derivatives of carbide. Starting with coal and lime as raw materials, it is possible by electrical means to produce carbide passing on to cyanamide (a very valuable fertiliser), thence to cyanide, explosives and other products of which this country should demand an ever-increasing consumption. The establishment of such industries would open up an extensive field and one which should play a very important part in the future prosperity of this country.

TOPICS OF THE WEEK.

FAR EAST RAND DEVELOPMENTS.

The Daggafontein scheme was duly passed by a shareholders' meeting in London this week, and we are authorised to state that work will recommence on the property at once. The cabled summary of the scheme appearing in the local papers this week is obviously incomplete, and certain details remain to be filled in. As far as it goes, however, the scheme as cabled may be put on record. Proposals were accepted from the the Consolidated Mines Selection Company, by which the Daggafontein Company receives 398,033 shares fully paid in a new company to be registered in the Transvaal, having an initial capital of £540,000 in one pound shares; also the Daggafontein Company has the option of subscribing for a further 134,126 shares in the new company at par for three years from the registration of the new company; but to wipe out the Daggafontein Company's debt to Henderson's Transvaal Estates 129,780 shares will be transferred to Henderson's Transvaal Estates with investments valued at £17,000, leaving 268,253 shares and options to be retained by the Daggafontein Company. Mr. Latilla was in the chair. In the course of his speech he explained that the company would sell its mining property to a new company to be registered in Johannesburg, and the Daggafontein shareholders would receive for each hundred shares fifty in the new company and the right to call at par for three years for a further twenty-five shares. He emphasised that the board were perfectly willing to give an undertaking not to deal in the new shares or options until such time as they received the consent of a general meeting. Referring to the provisions for the extinction of the debt to Henderson's Transvaal Estates, the Chairman pointed out that the latter undertook to bear all future costs of the administration of the Daggafontein Company; consequently the existing Daggafontein interests would be shares and options, and the company would have no liabilities. The new company's capital would be 540,000 shares, but personally he thought it would be better immediately to register it with a capital of 700,000, as vendor shares had to be created and 300,000 shares issued for cash at par. The Chairman reviewed the assets of the new company, pointing out that the Daggafontein Company had spent £312,000 in sinking a shaft, and he mentioned the amounts which would accrue from claim licences, etc. He affirmed that the present offer was far and away the best received, and expressed his indebtedness to Mr. Kitzinger and his colleagues of the Consolidated Mines Selection Company for making themselves responsible for £300,000. He paid a tribute to the Consolidated Mines Selection Company's Johannesburg management. Comment may be reserved until the complete details are available. In the meanwhile it may be noted that it is an entirely good augury for the early development of the Far East that the accepted offer was but one of several made to the Daggafontein people. The Daggafontein property has some promising neighbours, and it is reasonable to infer that their owners may now be approached by some of the parties whose offers were refused by the Daggafontein people. The Daggafontein farm, it is expected, will shortly be proclaimed. De Reitfontein, on which the Springs Mine is situated, was recently proclaimed. The freehold of the farm belongs to the Coal Trust, and not to the Springs Mines, as has been stated in the London papers. It may be added that considerable prospecting activity prevails on the neighbouring farms, Marievale, Reitfontein 319, and Vlakfontein. Results so far achieved on all three are said to be very promising.

THE PROJECTED DIAMOND MERGER.

It is expected that the annual meeting of the Premier Diamond Mining Company, Ltd., which is to be held on the 28th February, will throw light on the projected fusion of the big diamond producers. In financial circles the fusion seems to be regarded as the inevitable outcome of the conditions now governing the diamond industry. It is pointed out that the remarks of Mr. Gustav Imroth, who presided at the last meeting of the Premier Company, have now a special significance. "In connection with the future of the diamond market," said Mr. Imroth, "I look upon the conference of diamond producers, which was held in London last June, as being of the very greatest importance. At first it seemed doubtful whether any basis of agreement could be arrived at, but subsequently two provisional agreements were entered into—one between the producers, which had for its object the elimination of the evils of competition by regulating the output and the selling price. The second agreement was as to the method of selling, and it was agreed that the producers should be the principals in regard to selling, and that they should determine the prices, also that the selling agent be an agent only. Although these agreements were rendered ineffective by subsequent events, yet I cannot but think that they will form the basis of agreements which will be entered into when the diamond business is restored to normal conditions. Should this be the case, the industry will find itself in a sounder position than it has ever been in its whole history, and we can look forward to times of renewed and increased prosperity which will, to a large extent, be compensation for the period of stagnation through which we are now passing." The importance of a working agreement between the producers has never been better explained than by Colonel Harris at a meeting of the New Jagersfontein Company some years ago. "We must always bear in mind," he said, "that diamonds, the most brilliant and beautiful of nature's gems, are imperishable, inconsumable, and essentially an article of luxury. All this necessarily implies that as a commercial commodity diamonds are peculiarly sensitive to the financial state of the world in general, and especially of those countries from which the purchasing power is chiefly derived. These conditions make it almost imperative that the total production should be regulated and the sales controlled, so that the markets may be fed and not glutted." That the restoration of prosperity to South African would not be long delayed "when this desirable object is once achieved," was the conclusion come to by the Chairman of the New Jagersfontein. At the annual meeting of De Beers in 1912 it is pertinent to recall that the Chairman, Mr. Francis Oats, showed that in pursuance of the policy of restricting production in order to uphold prices, De Beers had acquired interests in other and poorer mines. Obviously from that it was but a step to the present proposal.

RAND CAPITAL, DIVIDENDS AND PROFITS TAX.

The somewhat anomalous position of the Randfontein Central Gold Mining Company, Ltd., which made a net profit of £187,258 during the year 1914, and was compelled to hand over to the Treasury no less than 31 per cent. of this amount, instead of the usual 10 per cent., which is commonly supposed to represent the absolute limit of the profits tax, is one that deserves the thoughtful consideration of the mine-taxing party. The explanation of this state of things is, of course, that the Treasury takes quite a different view of the factors that constitute profits, from that which is held by the company. It will be seen in the case of the Randfontein Central, for instance, as it is demonstrated by the directors in the brief statement that appeared in our last issue, that various large expenditures on what is called capital account were made by the company during 1915, so that practically nothing was left for dividend purposes beyond an interim declaration of 2½ per cent., amounting to £108,592, which was made in June last. Compared with this amount, the sum of £66,000, comprising the special levy and ordinary 10 per cent. profits tax, is clearly a severe drain upon the resources of the company, and a distinct injustice to the shareholders. The reply of the Treasury to the complaints of shareholders is that this capital expenditure may be wiped off by annual instalments during the life of the mine, but that, unfortunately, is not the view which is taken by the company's creditors. A concern that is making sufficiently large annual profits to be able to provide for a satisfactory dividend over and above the necessary expenditure on capital account has, perhaps, not much to object to in the ordinary working of the Taxation Act, but inasmuch as the law does not discriminate it is evidently susceptible of a great deal of improvement. It is unnecessary to enlarge upon the subject upon this occasion; indeed it would be impossible to do justice to it within the limits of a single issue. It is enough to draw attention to the real defects which the law exhibits in dealing with certain individual cases upon a single rigid plan. Another fallacy which seems to prevail among the mine-taxing party, in spite of the evidence of figures which are published from time to time in official records, is that the dividends upon the capital of the various Rand mining companies are sufficiently high to be able to stand considerable reduction, and that even then the remaining benefits should be high enough to induce a constant flow of new money for the further development of the mining industry. Apart from the objection which financiers have to investing their money in an industry which is liable to periodical and inconsidered attacks for purposes of State plunder, there is the still more valid objection that the gold mines of the Rand are not, on the average, paying more than a reasonable dividend as it is. Of the fifty mines, more or less, that were working on the Main Reef zone during the year 1915, excluding the New Rietfontein, as being upon another line, some forty only made dividend declarations. The total amount of issued capital of all these mines, as shown in the Chamber of Mines monthly return for November last, was £47,222,589, of which amount £9,428,432, or say 20 per cent. of the whole, obtained no remuneration whatever. The actual position is shown at a glance in the following table, where the total capital of the producing companies is divided into portions according to the several rates of dividend declared upon them during the year under review. For example, the smallest group, comprising 9·9 per cent. of the whole issued capital, drew dividends ranging above 40 per cent.:—

Issued capital.	Per cent. of Total issued.	Dividend per cent.
4.654.731	9.9	From 40 upwards
6,671,892	14.1	Between 25 and 40
5,533.450	11.7	,, 15 and 25
14,839,622	31.4	,, 10 and 15
6.094.462	12.9	,, 2½ and 10
9,428.432	20.0	Nil.
47,222,589	100.0	

From this table it will be seen that 64 per cent. of the total issued capital of the producing companies of the Rand received dividends amounting to less than 15 per cent. As a matter of fact, upon 45 per cent. of the total not more than 10 per cent. was paid. Now it is a fairly well-accepted view that the rate accruing to more than half the capital as shown above is by no means a high rate for mining ventures with such risks as those which attend operations along the line of reef at the present day. The big dividend of 80 per cent.—to say nothing of the 50 per cent. bonus—of the Meyer and Charlton, together with the high return of the Modderfontein B. at 67½ per cent., are due to such phenomenal profits as 27s. 6d. and 25s. 3d. per ton milled respectively. The New Heriot, with a profit of 14s. and comparatively small capital of £115,000, helps also to the swelling of the average. The Crown Mines, on the other hand, which comes fourth on the list with a dividend of 65 per cent., has a working profit which, at 7s. 9d. per ton milled, is lower than the average for the whole Rand at 8s. 1d. In the second group such companies as Modderfontein Deep Levels, City Deep, New Modderfontein and Van Ryn Deep may be regarded as quite exceptional concerns, with profits ranging from 20s. 5d. to 19s. 10d. per ton milled. With these half-dozen or so eliminated from the list, the average yield upon the par value of Rand gold mining shares would present by no means a brilliant appearance. Their inclusion helps materially to make up the average rate of 16 per cent. on the total capital of the producing mines, which is represented by the dividend of seven and a half millions odd that was declared during last year.

UNION COAL AND BASE METALS IN 1915.

Coal Industry Slowly Progressing—Tin Returns Steady—Advance of Transvaal Copper Output—Cape Asbestos Output Increasing.

THE returns of the Department of Mines and Industries for the month of December complete the yearly review of the coal and base metal industries of the Union, and enable us to see how far progress has been made during the period. It is rather regrettable that totals have not been given, so that the reader might be saved the trouble of lengthy additions that might well be performed by the statistical clerks, and will, as a matter of fact, appear in the next month's returns. During the month of December there were fifty-nine collieries producing coal in the Union, of which number twenty-six were in the Transvaal, and seven, five and twenty-one respectively in the Cape, Orange Free State and Natal Provinces. It is interesting to note that the average percentage of waste sorted to tons mined was as follows: Transvaal, 12·28; Cape, 19·16; Orange Free State, 3·94; and Natal, 25·52 per cent. Prices at the pit's mouth averaged for the Transvaal 4s. 3·94d.; Cape, 11s. 7·54d.; Orange Free State, 5s. 1·15d.; and Natal, 6s. 7·93d. per ton, the prices being slightly higher than during the year 1914 in the Cape Province, and a little lower in the other Provinces. The quantity of coal sold in the Transvaal during the year 1915 amounted to 5,202,805 tons, as against 5,157,268 tons for the year 1914, thus showing that the consumption by gold mines and in other ways was improving, although still in arrear as compared with the quantity sold during 1913, which showed the record figure of 5,225,036 tons. The following is an abstract from the progressive totals shown by the Department:—

	Transvaal. Tons sold.	Cape. Tons sold.	Orange Free State. Tons sold.	Natal. Tons sold.
Year 1913	5,225,036	67,481	609,973	2,898,726
Year 1914	5,157,268	53,621	699,217	2,567,817
1915—January ...	368,295	3,096	47,210	187,606
February ...	319,670	3,291	58,546	153,419
March ...	414,687	3,622	64,627	161,607
April ...	427,413	4,693	57,844	169,547
May ...	449,205	3,335	62,097	197,155
June ...	484,301	4,408	67,988	196,052
July ...	506,463	4,394	69,635	208,361
August ...	493,424	4,354	61,426	202,781
September .	448,285	4,198	59,591	213,026
October ...	415,234	3,820	58,250	187,534
November .	451,630	3,463	58,568	218,138
December .	424,198	4,176	61,758	208,890

The production from the Cape Province is falling off materially, it may be remarked, the quantity sold in 1912 being 74,701 tons, and in 1911, as much as 89,023 tons.

COPPER AND TIN.

It will be seen from the accompanying table that the copper output of the Transvaal has, during the last few months, exceeded that of the Cape mines in Namaqualand, which have for many years upheld the name of South Africa as a producer of base metals. The total value of the tin sales from the Transvaal for 1915 has exceeded that for 1914 by over £30,000, but it is regrettable that the yield from the Cape Province for last year has dwindled down to less than three-fourths of the previous return. It seems, indeed, to have temporarily ceased, or at least to be existing in a spasmodic sort of way. The returns for the last three years are as follows:—

	Transvaal.		Cape.	
	Copper. £	Tin. £	Copper. £	Tin. £
Year 1913	£138,328	£427,863	£369,528	£8,687
Year 1914	320,327	307,282	372,028	4,109
1915—January ...	33,095	37,690	—	—
February ...	—	30,490	—	—
March ...	—	27,998	—	—
April	83,872	18,784	146,817	—
May	17,610	27,093	—	—
June	36,977	29,849	—	1,345
July	44,870	22,733	—	—
August ...	35,626	25,000	125,278	18
September ..	29,199	18,414	—	1,547
October ...	43,009	26,708	—	—
November ...	44,675	48,233	—	—
December ...	39,734	24,496	137,031	—

ASBESTOS AND OTHER MINERALS.

The statement regarding asbestos and other minerals is given below. Asbestos, mainly from the Griqualand West district, near Prieska; lime, almost entirely from the Transvaal; and soda from the salt pan, north-west of Pretoria, where there is a new and thriving industry, apparently, are among the principal products on the list. Silver in gold bullion may be considered a bye-product of the Transvaal mines. The miscellaneous figures refer to pyrite, antimony, etc., but mainly antimony, no doubt:—

	Asbestos.	Graphite.	Magnesite.	Lead.	Zinc.	Lime.	Flint.	Soda (crude)	Miscellanecus
Year	£	£	£	£	£	£	£	£	£
1913	16,028	1,257	1.194	1,199	—	118,984	3,789	185	310
1914	20,087	970	1.451	1,396	—	109,041	2,508	7.196	144
1915									
Jan. . .	1,291	56	220	—	—	5,697	275	—	—
Feb. .	2,050	69	303	—	—	8,044	230	—	—
March .	1,930	48	82	135	—	8,407	313	3,764	—
April .	2,065	90	83	205	—	8,815	291	1,744	—
May .	2,383	66	110	213	—	8,426	164	1,742	50
June .	2,323	74	110	100	732	10,069	60	1.613	—
July. .	2.473	193	110	132	3,880	8,893	130	1,855	124
Aug. .	3,567	188	110	210	—	9,469	256	1,815	158
Sept. .	3,979	82	110	310	2,175	7,623	220	3,060	1.228
Oct. .	4.412	47	110	231	—	9,524	163	1,863	346
Nov. .	4,497	165	110	100	—	11,379	138	1,768	1,900
Dec. .	5,009	126	110	200	2,406	9,210	17	1,725	1,761

LABOUR.

The labour employed in the Union in base metal mines and works averaged, for the month of December last, 587 whites and 7,414 coloured for the base mineral mines, and 58 whites and 970 coloured employees in lime and flint and similar occupations. All these form a very small proportion of the whole labour force of other Union mines, as for instance 22,910 whites and 222,735 coloured persons in gold mines, 1,248 whites and 2,054 coloured in diamond mines, and 1,274 whites and 24,595 coloured in coal mines. The grand total of employees in all mineral industries of the Union, for the last month of the year, averaged 26,236 whites and 258,797 coloured employees, as compared with an average of 25,007 and 209,053 respectively in December, 1914.

DIAMONDS.

The diamond output for the Union is only recorded twice a year, the next statement being due at the end of January.

BASE METAL CLAIMS.

The number of base metal claims held at the end of December last were 32,367, being a considerable increase on the number of 26,896 which were registered at the corresponding date in 1914.

Klerksdorp Diamonds.

The diamond returns from the Western Transvaal fields show a steady improvement. In January last year the output had dwindled down to a value of £2,600, and it has steadily and gradually improved up to £14,657 for December. Bloemhof is still the premier contributor with a value of £2,842 and London comes second with £2,619. Good finds have been made on farms in the vicinity of London, and some new proclamations will shortly be made. Eastleigh had been practically abandoned, but in December finds to the value of over £400 were made, including one stone of the value of £138.

ANTIMONY IN SOUTH AFRICA.

A Boom in Selling Prices—The Opportunity of the Murchison Range—A Field for Companies with a Modest Capital.

A RECENT cable from London has drawn attention to the high price of antimony, and people in the Union are informed at the same time that the Transvaal is believed to be distinctly rich in antimony ore, and that South Africa is not yet scratched as regards base metals. The moment is considered opportune for the Union Government to take the initiative in developing known deposits, and it is said that the shipping of South African antimony would be beneficial both to the Union and the British taxpayer. Whether all this information is likely to have any effect upon the South African public remains to be seen. The existence of thirty or forty miles of antimony bearing reef along the Murchison Range, east of Leydsdorp, has been known and talked about any time during the last twenty-five years, and numerous attempts have been made to open up the deposit, mainly for the sake of the high gold contents which are shown here and there. Since the beginning of the war interest has been aroused once more in the possibilities of the district, but beyond the limits of a few scattered concerns the country is as lifeless as it has been since the nineties. The United Jack is among these few, but the ill success which has attended the gold-antimony reduction plant has tended to throw cold water upon the efforts of those persons who have endeavoured to raise capital for the exploitation of the antimony ore by itself. There are, nevertheless, one or two smaller ventures which one does not hear about, for the very excellent reason that their owners are not looking for advertisement. They are carefully avoiding it in fact, and in the circumstances therefore we refrain from mentioning their names. They are yielding handsome returns upon the outlay incurred upon them. That the United Jack is not equally fortunate is merely because gold as well as antimony is being called for. As an antimony proposition alone, if the high gold values could be disregarded, it would take a prominent place among any of the blocks along the range.

THE ANTIMONY REEF.

The well-known antimony reef, so-called by reason of the high percentage of stibnite, or antimony sulphide, which distinguishes the quartz horizon that composes the ore-body along a continuous line from Leydsdorp to beyond the County Down mine, is located in schistose rocks which dip almost vertically towards the north. The reef itself is made up of lenticular bodies of quartz, mingled with calcite, dolomite, and iron carbonates. The ore occurs in bunches and masses of considerable size, and can occasionally be followed over long distances along the line of strike and in the drives which have been made at various depths below the surface. The reef varies, of course, in thickness, as such bodies usually do, but the average width in many places is between three and ten feet. In one place a width of twenty feet has been measured. The lenses, or seams of quartz, as they may be termed, die out at intervals and re-appear at no great distance, not necessarily in precisely the same direct line, but within small limits in the same horizon, so that for all practical purposes the name Antimony Line very well expresses the fact of slightly interrupted continuity. With such an extended length of mineralization it can scarcely be doubted that there is permanence in depth to a degree commensurate with that of similar prominent ore-bodies in other parts of the world, it being remembered, of course, that the lenticular character of the "reef" continues downwards as well as longitudinally. However that may be, there can be no doubt that the deposit of antimony in the Murchison Range is enormous, and now that there is a possibility of working the ore profitably for its base metal contents it may be hoped that some effective steps will be taken to take advantage of the favourable conditions that exist there. A line of railway connected both with the Pretoria-Delagoa Bay main line at Komati Poort, and with the Pretoria-Messina line at Zoekmakaar provides excellent transport facilities. The principal difficulty to be contended against is the want of water, but this has already received the consideration of the Government, and the trouble could be easily remedied in a very little time if the expenditure were warranted by the needs of a substantial industry. Since elaborate dressing plant would be unnecessary in most cases at present, where cobbing by native hand labour would meet requirements satisfactorily, the water difficulty could be largely obviated until such time as the Government would come to the aid of the mines. The Murchison Range, as an antimony proposition, has the advantage that, in existing circumstances, it could be conveniently taken in hand by companies of quite moderate means.

Springs Mines.

The directors' quarterly report of operations at the Springs Mines for the period ended 31st December, 1915, shows that the quarter's development, together with a summary of the work so far accomplished, were as follows:

Working Place.	Total Footage.	Footage on Reef.	Footage Sampled.	Reef Width Inches.	Assay Value Dwts
For quarter	5,037	3,896	3,910	14·24	24·97
Previously reported .	27,910	14,554	17,820	22·21	16·92
Totals and averages	32,947	18,450	21,730	20·78	17·91

Of the footage sampled during the quarter, 49 per cent. was in payable areas and averaged 36·47 dwts. over 18·03 inches. A similar analysis of the total development to date shows 53 per cent. of payable footage, averaging 25·00 dwts. over 25·26 inches. An estimate of the total tonnage indicated by development accomplished to 31st December, 1915, shows: Payable, 1,125,000 tons at 10·4 dwts.; unpayable, 1,147,000 tons at 1·82 dwts. The payable tonnage is calculated over an average assumed stoping width of 57 inches, and represents 49·5 per cent. of the total. Good progress continues to be made in connection with the reduction works. The Rand Water Board took 60,710,000 gallons of water during the quarter. The farm Rietfontein No. 14, on which the company's mineral rights are situated, has been proclaimed a public digging for precious metals, and the mynpacht has now been granted to the company. During the period under review the issued capital of the company was increased by £145 to £630,145 by the conversion into shares of option certificates issued to the original allottees of debentures.

Vogelstruis Estates and Gold.

The annual meeting of the Vogelstruis Estates and Gold Mines, Ltd., was held in London on December 15, Mr. J. S. Morrison presiding. In moving the adoption of the report to June 30 last, he observed that in the last few years they had been engaged in a continuous struggle to make ends meet, and when they realised that in this period they had carefully expended no less a sum than £65,000, and, in addition, paid arrears of income tax and debenture interest overdue, including the income-tax thereon, representing £11,000, and making in all over £76,000, shareholders could form some idea of the strenuous times experienced. During the year under review, the debit balance of profit and loss account had been reduced by over £5,000; and now that they were all but finished with extraordinary expenditure, the remaining debit of £29,910 should disappear more rapidly in future years. The report was unanimously adopted.

SOME FEATURES OF THE RAND GOLD MINING INDUSTRY.—II.

[By W. A. CALDECOTT, D.Sc.]*

The result is that most able and enterprising technical graduates prefer to engage in mining rather than metallurgical work, in the hope of ultimately attaining a manager's position, and since the number of such men is strictly limited, the progress of ore treatment is not adequately advanced by the energy and capacity of this class. As elsewhere than on mines, the worker's success in competition is largely the resultant of will and ability, and the objective of the first decade of working life should usually be experience, matters of position and pay being considered as secondary until a later period. Although the Rand is often regarded outside its own boundaries primarily as a share-dealing centre, this business really affects its great industrial population and welfare only to a minor degree. Whilst the sale of shares serves as the readiest means of raising capital for mining enterprises, yet the share values of a producing mine are of comparatively little importance to the bulk of the population of the Rand and of South Africa. A poor mine pays wages and indirect taxation, and consumes supplies and maintains its workers in the same way as does a rich property, in proportion to its scale of operations. Since dividends mainly go overseas, a large low-grade property is of much greater value to the State, and supports a much larger proportion of the community than does a small rich mine. A mine crushing ore under 5 dwt. per ton in value contributes nearly half as much again of the indirect taxes included in working costs per ounce of gold recovered as does a 7½ dwt. mine. The value of the gold-mining industry to South Africa is peculiarly evident at the present time, when, but for our gold export, the whole country would have but little to send in return for its many million pounds' worth of imports in the shape of foodstuffs and manufactures. The paper by the author previously referred to was written shortly after the ending of the South African War, when the mining industry had hardly recovered from a prolonged suspension of its activities. Large though the scale of operations was at that time, the scope of these has now greatly increased, and various possibilities foreshadowed in the paper are now routine actualities. Among these is the economic increase of the percentage recovery of the gold contents of the ore, then estimated at 90 per cent. The possibility of increasing this percentage to any desired figure by finer crushing of the ore, causing more perfect exposure of the gold particles, and more efficient cyanide treatment, was indicated; the use of tube-mills for finer crushing has now enabled the amount of gold lost per ton of residue to be reduced to one-quarter of the pennyweight per ton of ore, then stated to be the usual total residue value. At the present time, in a well-equipped and adequate modern reduction plant, and at a cost well under the value of 1 dwt. of gold, a total residue worth only about 1s. per ton can be profitably obtained, which, on ore assaying 8 dwt. per ton in value, would be equivalent to an extraction of 97 per cent. This percentage would be capable of still further increase but for the consideration that "metallurgy is the art of making money out of ores" and that the treatment operations involved must hence stop short of the point where any additional gold recovered would cost more to obtain than its value. Such limit is not, however, a fixed standard, since a variation in the cost of any factor involved in ore treatment, such as labour, power, stores, or changes in local conditions, immediately raises or lowers working costs, and consequently the "economic limit" of extraction. With reference to the improvement in metallurgical methods, detailed progress is constantly being made, which in the aggregate is of great miportance, although a device or method merely "different" is liable at times to be mistaken for something "better." Radical improvements, however, occur seldom, and in the history of the Rand few can be reckoned as such beyond the application of the cyanide process, first for the leaching of sand, and subsequently for the decantation treatment of slime; the application of the zinc-lead couple for the precipitation of gold from very weak cyanide solutions; the recovery of water for re-use direct from the overflow of the slime-collecting vats; the building of very large and relatively cheap plants composed of correspondingly large units grouped together to deal profitably with low-grade ore; the introduction of heavy coarse-crushing stamps with secondary re-crushing in tube-mills; and the gradual improvement in simplicity and efficiency of pulp classification methods. The employment of vacuum slime filters has enabled a better extraction of the gold to be obtained from the slime, particularly when relatively high in value, than the ordinary decantation process; and the use of scoop discharges in tube-mills materially increases their crushing capacity. Although sand-filling is essentially an underground operation, yet the transportation on the surface as pulp of the sand residue employed has been greatly developed, and problems such as the neutralisation of acid mine water underground with limestone crushed to the fineness of cement, and the allaying of dust from the sand dumps by covering with a thin layer of mud from natural clay or slime residue, are still engaging attention. A very small proportion of the numberless proposals for improvements in current ore treatment methods has proved of sufficient utility to fulfil the hopes of those who brought them forward. As a rule, most real advance has been of gradual growth and development, unsuited for protection by letters patent, and hence benefiting the mining industry in general rather than any individual. Besides proposals emanating from an imperfect knowledge of actual local working conditions, many schemes are merely inferior variants of common practice. Very often more discernment is required to realise the need for an improved process or device than ingenuity to supply the want. New proposals can only be safely adopted as an essential part of ore treatment after tests have been successfully and continuously carried out on a working scale for a considerable time. In the spread of technical knowledge and the advancement of metallurgical practice the Chemical, Metallurgical and Mining Society of South Africa has played a very important part, and the eight thousand pages of its *Journal*, published during the 21 years of its existence, constitute a mine of information for everyone engaged in the extraction of gold from its ores. The price of gold being non-competitive has facilitated the publication and discussion of current practice or proposed developments, and the realisation of the obligation that each worker owes to his fellows of contributing to the common stock his quota of information in return for the far greater amount which he has received from others has hitherto weighed with a sufficient number of those concerned to very fully justify the Society's activities for the benefit of the gold-mining industry. The existence on the Rand of a number of groups under different controls has also been a factor in progress, since the friendly competition for better results, and the diversity of opinion and methods employed to attain this end, have prevented the paralysing effect upon varied advance, which extreme concentration of technical control might cause. At the same time the group system, embracing several mines in each group, allows the cost of trials to fall lightly upon individual mines, as well as affords a ready means of ensuring the prompt adoption of any improvement on all the mines of the group. The group system and organisation, which is more highly developed on the Rand than on most mining fields, facilitates the provision of capital for opening up new mines or extending the scale of operations on producing mines, as well as renders available for each mine a specialised technical staff, whose cost would be an unwarrantable expense for any individual mining company. The scale of operations on the Rand may perhaps be best realised by a few concrete illustrations. For instance, the additional refining charge of one penny per ounce of bullion recently imposed on the Rand output by the London refiners amounts to about £40,000 per annum. The previous costs of transport, insurance and refining the Rand bullion production of about one ton daily amounted to about 1 per cent. of its value, or, say, £350,000 per annum. A penny (0.02 dwt.) per ton of ore increased or decreased working cost, or variation in gold extraction, is equivalent to £100,000 on the tonnage of ore milled yearly on the Rand. In a plant such as the Knights Deep, Limited, crushing 3,500 tons of ore daily, twelve times this weight in all is elevated and transported as pulp, and the gold precipitated daily from 1¾ million gallons of gold-bearing solution. A slime charge of four hundred tons of solids with sufficient solution to form a fluid pump is pumped within an hour to make room for a succeeding charge, and in general, cheap and speedy transport of solids, fluids and pulp constitutes one of the main factors in the efficient and satisfactory operation of a modern reduction plant. A feature of the development of ore treatment, which has not been generally realised, is the great decrease in the capital cost of reduction plant. Plants erected in 1903 cost about £215 per ton of ore treated per working day, which was much less than previously; but the increased scale of operations, larger size of all units—stamps, tube-mills, vats, pumps and piping—and simplicity of design have reduced the coat in recent years to about £107 per ton for a plant crushing, say, 3,000 tons per working day. In the older plants much of the advance made during recent years in economy and efficiency has been secured by application of the foregoing principles, which has frequently involved elimination of existing devices and appliances. Among these are the entire elimination of stamp-mill amalgamated plates, the substitution of a few large steel cone diaphragm classifiers for existing nests of numerous small pyramidal wooden spitzkasten, and the continuous collection of sand by vacuum sand filter tables, thus avoiding the cost of sand collecting vats for drainage and storage only. At the present time the process of application and of full utilisation of the knowledge already gained is more pronounced than any apparent impending new developments, though minor advances are continually in progress. In considering the local conditions of gold extraction, to the prime factors of continuity of large scale operations, the cheap cost of coal for power, a healthy climate and accessible locality, must be added the simple nature of the banket ore, and its amenability to amalgamation and cyanide treatment. Consisting, as the ore essentially does, mainly of silica with some combined silicates and about 3 per cent. of pyrite, its constituents offer few difficulties in treatment, and the chemistry of the processes involved has been worked in its essentials. The possible greater compactness due to greater compression at increased depth merely involves somewhat finer crushing, though in no case has the proposal, based on experience on other fields, to all-slime the ore in place of crushing to fine sand and slime been found either necessary or economically desirable. On certain mines on the Eastern Rand portion of the gold appears almost uniformly diffused in an extremely fine state of division throughout the siliceous matrix, and in such case very fine, though leachable, sand is desirable. Similarly, the various costly attempts in the past to concentrate out the bulk of the gold into a rich pyritic production of small weight and to discard a valueless tailing has proved futile, since the gold and pyrite are not proportionately distributed in the ore, and hydraulic classification for the re-crushing of the tailing pulp ensures the proportionately finer reduction of the specifically heavier pyritic particles which their value warrants. Attempts, accompanied by considerable expenditure, for rapid continuous treatment of the ore as one product, or of slime, have likewise failed. This was mainly because a considerable time is required to dissolve the gold particles in banket, and to separate the gold-bearing solution from residual slime, the power and maintenance costs of maintaining large tonnages of pulp in motion for long were excessive, and the ordinary methods commonly employed as a result of a quarter of a century's experience and development have gradually attained a degree of economy and efficiency which are difficult to rival. As everywhere with every ore, the best method is that which conforms most closely with the characteristics of the ore and utilises most fully local conditions. Another method which has been practised on a working scale is the use of a dilute cyanide solution in place of water for crushing, which is frequently associated elsewhere with the treatment of silver sulphide or gold telluride ores. In the case of banket ore, however, this procedure involves the abandonment of a cheap and simple means of recovering half to three-quarters of the gold in the ore, and necessitates a much larger cyanide plant and more prolonged and expensive cyanide treatment. In addition to the foregoing objections, there is liability to loss of gold-bearing cyanide solution and difficulty in obtaining accurate screen values. The retention of amalgamated plates, when crushing with cyanide solution, results in their gradual corrosion and the deposition of the dissolved copper on the zinc shavings. The importance of good classification upon crushing so as to prevent oversize particles escaping from the crushing plant has already been referred to; but the necessity is no less for ensuring proper separation of sand and slime, so that each may receive the cyanide treatment by leaching or settlement to which it is adapted, and in order that the sand residue be ultimately well suited for mine filling. The presence of either product in appreciable quantities in the other interferes with the extraction, slime in sand causing non-permeable sand charges, and sand in slime causing pump wear and slow dissolution of gold in slime charges. At the present time a tailing pulp classifier should yield a slime overflow, of which 99 per cent. passes a screen of 200 holes to the linear inch. Among the features of ore treatment practice, in which progress has been much marked, is the increased weight of stamps, and their duty in tons of ore crushed per 24 hours. In 1903 a 1,250 lb. stamp with a 5-ton duty was considered to be doing good work with fine screening, whereas most recently erected stamp mills have been equipped with 2,000 lb. stamps, giving a 20-ton duty with coarse screening up to ½-inch aperture. The number of stamps installed on a mine has, therefore, long ceased to be any criterion of the tonnage of ore crushed monthly. This advance has been rendered possible by the use of tube-mills for re-crushing the coarser particles in the screen pulp, and has great advantages both in saving capital expenditure and operative crushing costs. In a modern plant about two-thirds of the crushing is done in tube-mills, of which about three hundred have been erected on the Rand, having a crushing capacity of over a million tons of ore monthly. In ordinary battery practice, reduction of the ratio of water to ore, combined with high stamp duties, has greatly decreased the cost of pulp elevation and return water pumping costs, whilst the lesser volume of pulp has likewise decreased the classifier capacity necessary per ton of ore crushed. Owing to the tube-mill hydraulic classifiers determining the size of particles leaving the crushing plant instead of the apertures of the battery screen, exactitude of the latter has become of minor importance. Grading analyses of various crushed ore products have become as much routine tests as are assays, in view of the fact that percentage of gold extraction is a function of crushing, whilst the relative crushing capacity of stamps and tube-mills is determined from grading analyses on the "nominal crushing unit" system. In cyanide practice the influence of temperature upon the rate of slime settlement and of gold precipitation upon the lead-coated zinc shavings has been fully realised. The temperature of mill service water and cyanide solutions is therefore regularly recorded, and artificial heating employed in winter where economically practicable. Another development which has become generally accepted in Rand reduction works is the system of circuits, whereby oversize ore particles are returned for further comminution, or water and cyanide solution for re-use. A reference to a flow-sheet diagram will show that in addition to the tube-mill circuit and the mill service water circuit, both sand and slime solutions and residue discharge trucks have their own circuits, with the result that only the ore passes through the plant, carrying with it to waste, when discharged as residue, a certain amount of water in the form of dilute poor cyanide solution. This circuit system is largely the result of a limited water supply, and of the flat or gently sloping mill sites on the Rand, and is a distinct variation from the steeply inclined mill site in favour under other conditions, where the ore descends by gravity through the various stages of treatment, and the final tailings or residues are disposed of in a creek at the foot of the plant.

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*Paper read before the South African Association for the Advancement of Science.

The author's sincere thanks are due to Mr. D. W. Rossiter for furnishing much of the statistical data contained in this paper.

Sakalava Oil: Reduction of Capital.

A meeting of shareholders in the Sakalava Madagascar Proprietary Oil Fields was held on January 22. Mr. Lewis A. Stewart occupied the chair, and was supported by his co-directors, Messrs. L. H. MacCallum, H. J. Taylor, R. Tellam, and Dr. F. S. Lister. The principal business of the evening was to formally pass the resolutions authorising the reduction of the present issued capital from £82,714 to £41,357. This resolution was unanimously carried together with a resolution authorising the creation of 30,000 new shares of the nominal value of 10s. each, which shares are offered for subscription to registered shareholders only up to the 31st of January, 1916. A further resolution authorised the directors from time to time to further increase the capital up to £100,000 in all. In his speech, the chairman dealt with the easy terms of payment enabling a substantial number of shares to be taken up at a monthly expense that would not press heavily upon intending subscribers. As an example, 100 shares calls for £5 on application, £1 5s. on allotment, and 25s. per month until fully paid. In addition, subscribers who find it more convenient to pay off their instalments in larger amounts shall receive a free option certificate entitling them to take up a further 100 shares at par until the 31st of December, 1917. The chairman then went on to say that there was every reason why the new issue should be supported. They had a drill at work affording at the present time promising development. Further, that subject to certain contingencies the large 4,000 foot machine already on the property would be brought into commission. He also referred to the negotiations which are in hand for the exploitation of the ground by a large and well-known oil company, reports had been submitted and were being considered by the people in question. He submitted that the prospects of the company have never looked so bright and promising as they do to-day. He intimated that there were some 1,700 shareholders on the books of the company and that a small individual response if fairly general would at once ensure success. No effort had been made by advertisement or personal endeavour to obtain applications as until the meeting of that evening had adopted the resolutions, the board felt an active campaign should not be commenced. Notwithstanding the absence of these essential factors a gratifying response had been made, clearly showing the confidence existing among a large body of shareholders. Some 12,000 shares had been applied for practically without any organised effort. The next item on the agenda was to appoint two directors, and Mr. George D. Alexander, of Pietermaritzburg, and Mr. Charles Hosking, of Krugersdorp, were elected. A committee of seven shareholders—Messrs. George Goch, H. H. Wyndham, W. J. Hosking, Alex. Turner, A. C. L. Olsen, G. Irvine, and W. H. Dufty—was appointed to act in conjunction with the directors before disposing of any portion or portions of the company's ground. Some 4,000 shares were applied for at the meeting, bringing the total up to 16,000, and one of the largest shareholders authorised the chairman to state that he himself would take up 4,000 shares if a total of 26,000 was reached by the end of the month.

Mica.

Mica is of widespread occurrence and has been mined in many countries, but the world's production has come chiefly from India, the United States, Canada, German East Africa, and Brazil. Deposits of probable value are known in more than 20 of the United States. The distribution of mica deposits can be best determined by a knowledge of the rocks with which they are associated and their geographic occurrence. The matrix of mica is pegmatite, a rock allied to granite in composition, but of much coarser texture. Mica-bearing pegmatites are associated with crystalline rocks, either ancient metamorphic or igneous rocks. The absence of areas of such rocks indicates the absence of good deposits of mica, and their presence indicates a possibility of the occurrence of mica-bearing pegmatites.

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RAND METALLURGICAL PRACTICE.—II.

Discussion of the Paper of F. L. Bosqui, presented at the San Francisco Meeting of the Chemical and Metallurgical Society, September, 1915,

W. A. Caldecott, Johannesburg, South Africa.—The responsible position on the Rand occupied by the author during the past five years, his facilities for observation and experiment under working conditions, the wealth of detailed ore-treatment data at his disposal, and his association with the introduction and trial of Merrill zinc-dust precipitation, Butters vacuum filters and other appliances, entitle his opinions to close scrutiny and careful consideration. The obligation conferred, however, upon his readers, would have been even further enhanced if the expression of his opinion in general terms had been more amply supplemented by definite figures upon such crucial points as percentage recovery by amalgamation, ore-treatment costs for more than one company, assay values of residues, etc. The paper covers so wide a field that detailed criticism of all the points raised would occupy much space, and many features of interest, upon which various opinions exist, must be passed over. The author reaffirms his belief in the general economic suitability of Rand methods to local conditions, possibly the "exhilarating atmosphere" elsewhere or numerous innovations is more congenial to the temperament of enthusiastic inventors than to the shareholders in the mines concerned. In other words, Rand practice has been developed in accordance with the axiom that "metallurgy is the art of making money out of ores," and the fiduciary position of those responsible for advising upon the expenditure of shareholders' money on reduction plants necessitates the relegation of other considerations to a secondary position. The classification of variations in current ore treatment is of interest, but does not include the disposal of current sand residue as a pulp down boreholes for mine filling, a system which is extensively and increasingly practised; nor is there any reference to the collection of slime, for both decantation and vacuum-filter treatment, being carried out in ordinary decantation vats; nor to the slime residue in either case being pumped as a fluid pulp to slime residue dams. The proposed scheme for dealing with the 9-mesh ore from the breaking station is an interesting variant from current arrangements, and virtually constitutes a separate circuit for classifying out the solids and returning to the trommels the water in this product. Some increase in capital cost and attendance will, however, be involved by its adoption, and the same object could be more simply attained by allowing the washings to enter a pulp launder in the tube-mill circuit, the coarser solids thus added being compensated for by running some stamps with finer screening or an additional tube mill during such time, and the additional water being dealt with by adequate safety cones following the tube mill cones. Doubtless, owing to the author's personal experience of Rand methods only dating from 1910, some confusion as to developments prior to that date is apparent in the suggestion that the introduction of tube mills caused the development of heavy stamps. On the previous page the reason for the introduction of the latter is correctly stated as involving fewer crushing units with lower initial and operating costs, whereas the function of tube mills to secure cheaply any desired fineness of the crushed ore, and the coarse stamp-mill product most suitable for tube milling can be as readily obtained with a 1,250lb. stamp as with a 2,000lb. stamp. In passing, it can hardly be considered now that 9-mesh (0·272in. aperture) is the economic limit of screen mesh, as 0·375in. and 0·5in. apertures are in regular and satisfactory use at the large Robinson Deep mill and up to an inch aperture has been successfully employed elsewhere. The reason why these last screens are not in more common use is that they permit a comparatively small increase in stamp duty above a ⅜-mesh aperture, and are liable to cause banking in existing launders of limited grade. The statement that in future at the Modder B. a tube mill will deal with 264 tons per day of 9-mesh product mainly from ordinary stamps, whereas it can only handle 203 tons per day from Nissen stamps, indicates, assuming similar final pulp, that the screen pulp in the former case is much finer than in the latter, thus throwing less work upon the tube mill. Since the same battery screen is used in both cases, this illustrates the well-known fact that the stamp duty is no criterion of the work done in the mortar-box, unless account is taken of the grading analysis of the screen pulp. The assumption that 1,650 lb., and not 2,000 lb., is the economic limit of ordinary stamp weight is possibly based on trouble experienced through cam-shaft breakages when the latter were first employed with too high a number of drops per minute, but the fact that 1,900-lb. to 2,000-lb. stamps have been installed in nearly all recent mills (Consolidated Langlaagte, Government Mining Areas, Van Ryn Deep, Brakpan Mines, Roodepoort United, Main Reef and Modder Deep) shows that this difficulty has been overcome. The flow sheet of a proposed mill shows a double row of stamps, which is undesirable with heavy coarse-crushing stamps, both on account of the relatively limited bin capacity with high-stamp duties, and likewise because of the excessive lowering of the tube-mill cones required for the pulp from the back row of stamps. this loss of fall, involving additional plup re-elevation cost, is accentuated by placing the cones of four tube mills low enough to receive pulp interchangeably, whereas three constitute an ample measure of interchangeability. As the diagram shows, the tube-mill cones are at a very low level, and the tube mills, plates, and return pumps consequently require a considerable depth of excavation. In reference to the author's discussion of variants of amalgamation methods, the essential point appears to be missed, viz., that in modern mills the crucial factors of amalgamation recovery are the degree of liberation of the gold by the extent to which crushing is carried, and the efficiency of the pulp classification. The area of plates in the tube-mill circuit is quite secondary to these and mainly dependent upon the volume of pulp amalgamated, since with efficient classifiers gold particles of appreciable size merely circulate until amalgamated. The flow sheet of the proposed plant given in the paper shows that the overflow of the tube-mill safety cones joins the tube-mill outflow. With an imperfect arrangement of classifiers this may be necessary, and the cost of a considerable re-elevation of many thousand tons of overflow pulp daily in a large mill may be a warrantable expenditure in order to amalgamate gold particles overflowing the safety cones. The increased volume of pulp thus passing over amalgamated plates might require five of the latter per tube mill as advocated by the author, but when the tube-mill outflow only is amalgamated, three plates per tube mill have proven ample in practice under varying conditions on different mines, and at the Robinson Deep during 1914 with the design illustrated by Diagram C, the amalgamation recovery has amounted to 65·23 per cent. of the original gold contents of the ore, the sand residue averaging 0·315 dwt. per ton in value without ever showing any trace of free gold. It may be added that during 1914 this plant treated 576,370 tons of ore with a total residue of 0·252 dwt. per ton, equivalent to a recovery from all sources of 96·32 per cent., the slime original being 1·802 dwt. per ton and its residue after decantation treatment without air-lift agitation being 0·181 dwt. per ton. The appearance of free gold in the sand residue at the Modder B. may be due to various causes, but so far as classification is concerned one small safety cone between two tube-mill cones is liable to considerable overloading with pulp if its feeding cones are overloaded, and the installation of return cones for receiving tube-mill return pulp does not appear to be provided with safety cones, so that irregular distribution at this point is likewise liable to result in oversize particles or amalgam overflowing.

(To be continued.)

PROGRESS ON ALBU MINES.

Improvement at the Roodepoort United and Van Ryn Estate—Better Ventilation at the Meyer and Charlton—Changes at the Aurora West.

The quarterly reports of the producing companies under the control of the General Mining and Finance Corporation contain the following features:—

Van Ryn G.M. Estate.

Number of feet driven, sunk and risen, 2,663 feet; footage sampled on reef, 1,299 feet; average stoping width, 40·5 inches; average assay value over stoping width: Payable (776 feet sampled), 11·78 dwts.; low-grade (523 feet sampled), 2·59 dwts.; ore mined, 125,640 tons; less waste sorted out discarded (8·09 per cent.), 10,170 tons; ore sent to mill, 115,470 tons; working profit, £57,028 (9s. 10d. per ton). The working profit reflects an increase of £1,743 4s. as compared with the previous quarter, which is due to an improvement in the value per ton recovered. Sinking operations in No. 2 shaft were resumed during the quarter, the footage accomplished being 83 feet, and the expenditure amounted to £818 14s. 8d.

Meyer and Charlton.

Number of feet driven, sunk and risen, 1,302 feet; footage sampled on reef, 905 feet; average stoping width, 47·16 inches; average assay value over stoping width: Payable (593 feet sampled), 22·86 dwts.; low grade (312 feet sampled), 2·26 dwts.; ore mined, 46,866 tons; less waste ore discarded (4·975 per cent.), 2,332 tons; ore sent to mill, 44,534 tons; working profit, £61,269 (27s. 6d. per ton). The working profit is £22 19s. 3d. less than for the preceding quarter. The filled-in old Wolsingham shaft has been cleared of rock and timbered, and is now open to the 2nd level. This, it is hoped, will effect a considerable improvement in the ventilation of the mine.

Roodepoort United.

Number of feet driven, sunk and risen, 4,556 feet; footage sampled on reef, 2,550 feet; average stoping width, 47·53 inches; average assay value over stoping width: Payable (1,575 feet sampled), 7·55 dwts.; low-grade (975 feet sampled), 2·49 dwts.; ore mined, 115,750 tons; less waste ore discarded (9·43 per cent.), 10,910 tons; ore sent to mill, 104,840 tons; working profit, £11,675 (2s. 2d. per ton). The main reason for the satisfactory advance of £8,112 2s. 6d. in working profit for the quarter, compared with the preceding three months, is an improvement in stoping widths and increased sorting. It is anticipated that future monthly profits will show a very considerable increase over the average for the past year.

Aurora West United.

Number of feet driven, sunk and risen, 814 feet; footage sampled on reef, 525 feet; average stoping width, 42 inches; average assay value over stoping width: Payable (340 feet sampled), 8·29 dwts.; low-grade (185 feet sampled), 3·25 dwts.; ore mined, 48,636 tons; less waste ore discarded (13·60 per cent.), 6,617 tons; ore sent to mill, 42,019 tons; working profit, £8,985 (4s. 2d. per ton). The change over to the new incline shaft, headgear and winding engine was effected during November; this work involved the suspension of milling operations for four days, with a consequent decrease in tonnage and profit, and is mainly responsible for the higher working costs and the reduction of £3,250 2s. 10d. in the earnings for the quarter.

West Rand Consolidated.

Number of feet driven, sunk and risen, 5,123 feet; footage sampled on reef, 2,481·5 feet; average stoping width, 49 inches; average assay value over stoping width: Payable (1,410 feet sampled), 8·76 dwts.; low-grade (1,071½ feet sampled), 2·60 dwts.; ore mined, 107,869 tons; less waste ore discarded (12·48 per cent.), 13,469 tons; ore sent to mill, 94,400 tons; working profit, £34,331 (7s. 3d. per ton), an increase of £3,880 over that for the previous quarter.

New Goch.

Number of feet driven, sunk and risen, 1,030 feet; footage sampled on reef, 873 feet; average stoping width, 69 inches; average assay value over stoping width: Payable (543 feet sampled), 8·16 dwts.; low-grade (330 feet sampled), 2·94 dwts.; ore mined, 103,760 tons; less waste ore discarded (12·73 per cent.), 13,210 tons; ore sent to mill, 90,550 tons; working profit, £23,751 (5s. 2d. per ton), a decrease of £785 as compared with that for the previous quarter.

Brakpan Mines.

The directors' quarterly report on operations at the Brakpan Mines, Ltd., for the period ended 31st December, 1915, states that the linear development for the quarter amounted to 5,578 feet, of which 4,130 feet were on reef averaging 14·33 dwts. over a reef width of 24·94 inches. Of the footage on reef 1,600 feet were in payable areas and averaged 29·28 dwts. over 26·93 inches. Milling: Ore hoisted from mine, 214,404 tons; ore sent to crushing and sorting station, 215,132 tons; waste sorted out, 13·845 per cent.; average number of stamps running, 140; net running time, 85·166 days; ore milled, 185,948 tons; milling duty per stamp per 24 hours, 15·595 tons; yield in fine gold, 38,626 ozs.; yield per ton milled in fine gold, 4·154 dwts. Cyaniding: Tons treated, 184,135; yield in fine gold, 24,628 ozs.; yield per ton treated in fine gold, 2·674 dwts. Summary: Yield in fine gold: Mill, 38,626 ozs., equal to 4·154 dwts. per ton milled; cyanide works, 24,628 ozs., equal to 2·649 dwts. per ton milled; total, 63,254 ozs., equal to 6·803 dwts. per ton milled. Total working profit, £168,270 13s. 5d., equal to 18s. 1·184d. per ton milled; working profit carried down, £98,003 2s. 10d., equal to 10s. 6·491d. per ton milled; revenue, £266,273 16s. 3d., equal to 28s. 7·675d. per ton milled. The returns for the year 1915 are: Ore milled, 725,168 tons; gold declared, 240,327 ozs., equal to 6·628 dwts. per ton milled; working expenditure, £653,420 0s. 7d., equal to 18s. 0·25d. per ton milled; working revenue, £1,011,555 18s. 11d., equal to 27s. 10·78d. per ton milled; less further provision for gold realization charges due to war—for period mid-October to 31st December, 1914, £1,859 14s. 2d.; for the year ended 31st December, 1915, £9,515 8s. 11d., making £11,375 3s. 1d. for the war period; total, £1,000,180 15s. 10d.; working profit, £358,135 18s. 4d., equal to 9s. 10·53d. per ton milled; less £11,375 3s. 1d., £346,760 15s. 3d. No allowance has been made for profits tax or special war levy. In view of the changed conditions due to the war, provision has been made to meet the unforeseen increase in realization charges affecting revenue from gold. The additional charge is shown separately in the above comparative statement in order that a comparison with pre-war results may not be vitiated. Expenditure on development for the year ended 31st December, 1915, was more than covered by the fixed charge to working costs of 2s. 6d. per ton milled. The capital expenditure incurred during the six months to 31st December was £3,573, which amount has been provided for out of the unexpended balance of funds appropriated for capital expenditure. This unexpended balance (after receiving a credit of £5,299, arising from the sale of machinery) stood at £11,408 at 31st December, 1915. A dividend (No. 8) of 22½ per cent. (4s. 6d. per share) was declared on the 14th December, 1915, payable to shareholders registered in the books of the company at 31st December, 1915. The total declaration for the year ended 31st December, 1915, was 40 per cent. (8s. per share), involving the distribution of £300,000.

SOUTH-WESTERN TRANSVAAL DIAMONDS DECEMBER OUTPUT.

Best Month's Total of 1915—Detailed Results.

THE returns of diamonds found in the South-Western Transvaal during the month of December show a total of 3,311¾ carats, value £14,657 7s., which is the best total of any month during the year. The figures for the twelve months were as follows:—

	Carats.	Value.		
January	1,065¼	£2,593	5	6
February	1,607¾	4,273	11	6
March	2,066½	6,325	9	6
April	2,595	10,181	1	6
May	2,173	9,389	4	0
June	2,092¾	9,402	13	6
July	2,292	8,984	8	0
August	2,803¾	10,543	19	0
September	3,343½	13,191	5	6
October	3,750¼	14,454	15	6
November	2,918½	13,819	19	6
December	3,311¾	14,657	7	0

THE INDIVIDUAL PRODUCERS.

There were 39 different areas included in the returns, and these with their finds were as follows:—

	Carats.	Value.		
Bloemhof	629¼	£2,842	6	6
London	455	2,019	8	6
Dievedraai	410	1,899	0	0
Kafferspan	266	1,131	2	6
Koppiesvlei	155	700	10	0
Cawood's Hope ...	176¼	685	5	0
Mimosa	132¾	573	0	0
Kameelkuil	126¾	478	10	0
Klipkuil	114	465	2	6
Christiana ...	93½	424	15	0
Goede Hoop . .	83¼	410	8	6
Eastleigh .. .	90¼	409	8	6
Zwartlaagte . . .	77¾	358	5	0
Zevenfontein	69¼	310	10	0
Mooifontein	70½	285	7	6
Kromellenboog	56½	272	2	6
Panfontein	59½	267	17	6
Rietput	33¼	195	0	0
Diamantdoorns	34½	192	7	6
Geluk	11	108	5	0
Schweizer-Reneke ...	26½	96	10	0
Kuilfontein	23½	92	12	6
Johannesrust	11¼	90	0	0
Gezicht	8½	46	7	6
Middelbosch	8	43	5	0
Nauwpoort	6	35	0	0
Kareepan 137	9¾	31	10	0
Maroetjesfontein ...	7	30	0	0
Welgevonden	6¼	28	0	0
Vlaklaagte	27	25	0	0
Onrust	7½	26	0	0
Homansvlei	7¼	23	0	0
Boskop	1½	13	5	0
Mallabanistad	4½	15	10	0
Modderkraal	6¾	13	0	0
Olivenfontein	3	9	0	0
Wildehoenderk'l ...	2	9	0	0
Zoutpan	½	1	0	0
Goedgenoeg	1	0	15	0

New Insolvency Bill.

The draft Insolvency Act to be considered at the sitting of the Union Parliament next month does not appear to be a perfect model. One authority expresses the opinion that it is a "lawyer's" Act, and not an Act for the use of commercial men. Asked to explain the term, the critic replied that the Act was "built for litigation," and not, as it should have been, in order to minimise the work of settlement in cases of insolvency. The draft contains 161 clauses, and covers 42 pages of the *Union Gazette*, so that it is not possible to do more than to refer briefly to the more patent objections to it. The first fault to be found is that it is termed an Insolvency Act, whereas similar Acts in other parts of the world are known as Bankruptcy Acts. According to Webster the former is "a law affording relief to insolvent debtors for the benefit of their creditors," but a bankrupt law is described by the same source as "a law by which the property of a person who is unable or unwilling to pay his debts may be taken and distributed to his creditors, and by which a person who has made a full surrender of his property, and is free from fraud, may be discharged from the legal obligation of his debts." However, provided that the new Act creates a feeling of greater security to creditors, it is hardly probable that the title will be seriously objected to. There should be a clause known as the "dating back clause," under which certain acts of debtors are null and void if due within a period when the debtors were actually insolvent though not declared bankrupt.

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Enemy Trade.

In the House of Commons in mail week Mr. Peto (U., Devizes) asked the Secretary for the Colonies if he would say what steps were being taken to prevent trading with persons, firms and companies of enemy association in the Union of South Africa. Mr. Peto also asked the Secretary for the Colonies whether it was the intention of the Government to invite the Government of the Union of South Africa to pass legislation on the lines of the Trading with the Enemy (Extension of Powers) Bill, and generally what steps were going to be taken to secure uniform legislation on the subject of enemy trading throughout the Empire. Mr. Steel Maitland replied: Information with regard to legislation and executive action dealing with trading with the enemy, including the Bill recently introduced, is regularly communicated to the other Governments of the Empire. Absolute uniformity is not, I fear, attainable, and it must rest with the Governments of the different self-governing Dominions to decide how the general principles underlying British policy in the matter are to be applied. The Union Government has recently introduced a Trading with the Enemy Bill, but I have not at present received the text.

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ELECTROLYTIC PRECIPITATION OF GOLD, SILVER, AND COPPER FROM CYANIDE SOLUTIONS.*—IV.

[By G. H. Clevenger.]

Cathodes.

The lead-plate cathodes used at San Sebastian were constructed similar to the anodes, except that the sheet lead used was thinner. An interesting feature of the lead cathodes used at the Reliance mill was that they were not ordinary rolled sheet lead, as had been previously used elsewhere for both anodes and cathodes, but were plates cast upon an inclined machine at the Trail smelter. It was said that one man could make 500 cathodes in a shift. A piece of strap iron ¾ by ⅛ inch., the length being the same as the width of the plate, was riveted to the top. The connecting-wire was introduced between the plate and strap-iron in such a manner that one of the rivets clamped it firmly in place. The double brush was used at intervals for removing the slightly adherent deposit. The manner of using was to set it over the cathode so that a brush was bearing on either side of the cathode, when the whole tool was pressed downward until the brushes had reached the bottom of the plate; this operation was repeated until the whole surface of the plate had been covered. When it was desired to make a complete clean-up, especially if the plates were old, it was necessary to remove them entirely from the box and scrape them with the triangular scraper.

The by-products have always presented a serious problem. In the Siemens-Halske process, the Prussian blue, formed as a result of the attack on the iron anodes, had to be subjected to special treatment for the recovery of the cyanide and gold. The disadvantages arising through the separation of calcium salts, which deposited upon the anodes and cathodes and in the bottom of the box, was early noted in the application of the process. It has been variously estimated that from 0·6 to 25 per cent. of the gold had to be recovered from the by-products in the Siemens-Halske process. At Minas Prietas, the precipitation of calcium salts was especially troublesome, and owing to the method of operating in which the non-coherent deposit of the metals was collected in the bottoms of the boxes, all of this eventually became intermingled with the precipitate. At this time the calcium salts, chiefly the carbonate, formed a large proportion of the precipitate. This made the precipitate more difficult and costly to smelt. Lower current-density lessens the formation of the lime precipitate, but does not entirely eliminate the difficulty. In the course of time the lead anodes disintegrated so that they had to be discarded. At first these were shipped to lead smelters, but later they were re-melted locally, and after the separation of the dross, which had to be shipped to the smelter, were cast into slabs that were rolled by a special set of rolls into sheets which were used in making new anodes. At San Sebastian, where the gold and copper formed a coherent deposit upon the cathodes, it was possible to keep the deposit that accumulated at the bottom of the box separate from the deposited metals. However, the gold contained in this material was considerable, and at one time, when a considerable amount of it had been allowed to accumulate, it represented a great deal of money. The material more directly resulting from the disintegration of the anodes contained: Lead, 53·7 to 57·1 per cent.; copper, 3·1 to 4·7 per cent.; gold, 0·031 to 0·154 per cent. The fine material, or "lime" as it was termed, contained: Silica, 8 to 10 per cent.; alumina 22 to 28 per cent.; calcium oxide, 15 to 21 per cent.; lead, not determined; copper, 5·9 to 6·9 per cent.; gold, 0·322 to 0·363 per cent. A small blast-furnace and other equipment for refining was installed for treating the by-products, but on account of the high cost of coke and other supplies and the lack of skilled labour, it was generally found more economical to ship this material to smelters in the United States. No attempt was made to reclaim the anodes. At Virginia City the conditions were much the same as at Minas Prietas. A lower-grade precipitate was invariably obtained from the electrolytic-boxes than from the zinc-boxes on account of the calcium precipitate. At one time, as the result of careful sampling and assaying, it was estimated that the anodes contained about 10,000 ozs. silver. This came about by reason of the fact that the solutions contained chlorine. The source of this in the tailing was the salt added during pan-amalgamation, and, in the Tonopah ore, was due to the occurrence of part of the silver as chloride. The presence of the silver as chloride in the anodes was proved by solution in ammonia and the regular qualitative tests. In the earlier operation the disintegrated anodes were shipped to the smelter; but later it was found that by careful heating in suitable pots the greater part of the metallic lead could be liquated, leaving most of the gold and silver in the dross, which was shipped to the smelter and the lead cast into rods that were mounted in wooden supports and used as anodes.

Cost of Installation and Operation.

The cost of the six electrolytic precipitation boxes at Minas Prietas, Mex., was as follows: Box construction, $10,000; dynamos, $3,000; lead anodes, $4,455; tin-plate cathodes, $300; wiring, switchboards and instruments, $1,000; labour, $1,000; incidentals, $250; total for six boxes, $20,005. At Virginia City., Nev., U.S.A., the cost of six standard boxes was as follows: Box construction, $6,000; dynamos, $4,075; lead anodes, $4,080; aluminium cathodes, $1,598 (tin-plate cathodes also used); wiring, switchboards and instruments, $1,000; labour, $1,500; incidentals, $250; total for six boxes, $18,503. The only costs available for electrolytic precipitation are those given below, which are the average for six years' operation of the Minas Prietas plant: Power, $0·083; labour, $0·037; supplies, $0·031; depreciation, $0·040; total per ton of ore, $0·191.

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* Abstract of paper presented at the twenty-eighth general meeting of the American Electrochemical Society in San Francisco, September 16-18, 1915.

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THE NEW COAL-DUST EXPERIMENTS.—IV.

Seventh Report of the Explosions in Mines Committee.—Phthisis and Rand Mine Dust.

[By J. S. Haldane, M.D., F.R.S.]

He has kindly written to me as follows with regard to his experiences:—" My experience with flue dust is not altogether satisfactory. You remember the main road you examined in January, 1913. It had been treated twice, and your samples, taken after treatment with flue dust, showed (Mr. Winmill's figures):—

Fineness.

Through 30	38·5 per cent.
,, 30, left on 60	18·0 ,,
,, 60, left on 90	8·0 ,,
,, 90, left on 200	3·0 ,,
,, 200	10·0 ,,

Analysis.

Through 30	63·0 per cent. ash
,, 60	65·4 ,, ,,
,, 90	61·4 ,, ,,
,, 200	64·7 ,, ,,

" There were very good results from the point of view of rendering the coal dust harmless, but as time went on and the deposit increased, the men began to complain. After the fourth treatment, when all the ledges and cavities were practically filled, the dust was easily disturbed by passing tubs or men, and carried along in the air. The discomfort of this became so great that some of the haulage boys who worked on the road left, and others frequently stayed away. The dust was extremely irritating to the eyes, and gave a nasty gritty taste in the mouth. This was also the experience of officials passing along the road, and was the subject of complaint by the men when they travelled the road in a crowd at the end of the shift. The complaint applied to about 1,000 yards of the main intake haulage road, which was about 60ft. to 90ft. in area, and carried about 60,000 cubic feet of air per minute. We were obliged to discontinue the use of flue dust in this road. Possibly the objection could have been remedied by cleaning up oftener, and using less flue dust, but this would not be likely to give such security in practice as heaping up plenty of incombustible dust in every ledge and crevice until big proportions were got of 5 to 1, rather than occasional and indifferent cleaning and questionable proportions of about 1 to 1. In other roads in-bye we have not found flue dust so objectionable, but on the whole I think finely-ground shale dust is preferable. Flue dust has been used at other collieries here, but only to a small extent, and I have heard no complaint. Most people are using shale dust. The light colour of shale dust and the readiness with which it can be seen is an advantage not to be lightly ignored." We have tested the effects of flue dust on guinea-pigs in the same way and with the same periods of exposure as with coal dust and shale dust. As will be seen from the Appendix by Mr. Mavrogordato, the effects of the flue dust on the lungs of the animals were much more marked and more lasting. Signs of proliferation of epithelium were very marked in the lung alveoli, and remained very evident even after six weeks. The fine dust seemed to produce definite signs of slight broncho-pneumonia, and cells charged with dust were more abundantly present. Moreover, the dust remained in the alveolar epithelium to a much more marked extent than coal dust or shale dust. Six weeks after the exposure the dust cells were still abundant, and the sections of flue-dust lungs had a very definitely abnormal appearance, contrasting distinctly with the sections of the coal-dust or shale-dust lungs. No definite outward signs of illness were observed in the animals, however, and they continued to take their food as usual. The result of these experiments was somewhat of a surprise, since there was no reason to suspect the presence of fragments of crystalline silica in the flue dust. In order to throw further light, if possible, on the matter, we tried the effect of breathing the dusty atmospheres ourselves for short periods, through a face-mask connected by a short tube with the box in which the dusty atmosphere was maintained. With the flue dust it was noticed that discomfort was produced in the eyes, and gritty matter was very soon noticed in the mouth. The presence of this gritty sensation in the mouth reminded me at once of former experience in inhaling the dust from machine drills working in Cornish granite without a water-jet. There was no gritty sensation or definite irritation of the eyes when shale dust or coal dust was breathed. On taking a little of the dust (previously passed through a 200-mesh sieve) into the mouth the sensation of grittiness between the teeth was much less marked with shale dust than with flue dust; and the particles of shale dust seemed to yield much more to the teeth. With quartz dust from the Transvaal the grittiness was still more marked, and the same was the case with fine flint dust and ganister dust. Samples of flue dust kindly sent from different collieries in England and Scotland were examined in this way, but always with the same result. On warming and digesting some of the flue dust with about an equal quantity of distilled water, and examining the filtrate, it was found that though the latter contained some sulphate in solution it was neutral to litmus paper, practically tasteless, and had no irritant action when dropped into the eye. The irritant effect of the dust was therefore presumably due only to its mechanical properties and not to soluble substances contained in it. The analysis of Altofts shale dust by Dr. Mellor (Fifth Report of Explosions in Mines Committee, p. 33) gave as its result that about 35 per cent. of free crystalline silica is probably present in Altofts shale dust, along with aluminium silicate and other material. Taking the facts at present available together, it seems probable that crystalline silica is only dangerous when its particles are broken up into fine, sharp-edged dust particles. Grains of silica embedded in shale and many other stones do not appear to be sharp-edged. They have presumably been rounded by the action of water, like grains of sea-sand, and may apparently be also coated with coloid silica, as Dr. Mellor has pointed out. When shale is disintegrated in the ordinary ways, these particles, since they are surrounded by soft material and are quite small, will not be broken up, and consequently no sharp-edged siliceous dust will be formed. On the other hand, when the crystalline silica is present in larger masses, as in granite, or the stone is a mass of crystalline silica, as in flint, ganister, compact sandstone, etc., the silica will be broken up in the process of mechanical disintegration, and fine sharp-edged dust particles will be formed. Such dust will therefore be dangerous. Fused silicate in the form of dust is less hard than quartz, and usually more liable to solution or disintegration when it enters the lungs. For this reason it is probably less dangerous than quartz, but if the particles are hard and irregular in shape they must produce considerable irritation for a time. Flue dust consists, presumably, of fused silicate to a large extent. It is more or less rough and gritty when introduced into the mouth or eyes, and probably its gritty character explains its effects on the lungs of guinea-pigs. Nevertheless, there is no clear evidence that, if inhaled in small quantities over long periods, it would produce the serious liability to phthisis produced by the inhalation of fine quartz dust. It seems, on the whole, more probable that it might not produce worse effects than an increased tendency to bronchitis, such as seems to be produced to a greater or less extent by certain other kinds of the less dangerous dusts. Although flue dust is a suitable and very convenient material for rendering coal dust inexplosive, and although it does not seem probable that very serious effects on health would, in practice, arise from its use for stone-dusting in mines, I cannot, in view of the evidence mentioned above, recommend its use.

(To be continued.)

IMPERIAL TRADE AND INDUSTRY.

A Review of the Position as Created by the War.

Any Imperial Conference would have to consider a large programme of important subjects. Not only must there be indicated the lines of development towards greater industrial independence within the Empire, but it is desirable, says *Engineering*, that there should be unification of the patent laws, of the company laws, and of all regulations affecting trade and industry, including shipping conditions and the abolition of rebates. It is desirable, too, that there should be a more direct contact between the producer and the purchaser, without the intervention of the middleman to the great extent prevalent now; because there would be then a greater certainty that the goods supplied had their origin within the Empire, while the needs of the purchaser would be more immediately explained to the manufacturer, and possibly more completely met. Beyond this there is the important fiscal question, and this is particularly one of those questions as to which expediency rather than academic views or principles must be operative in the future. We do not approach the subject at present from the economic purist's point of view. We are faced in the immediate future with a huge task, owing to the prodigal expenditure of wealth, alike in the richly-cultured brains or physical properties of fallen soldiers, and of the immense flow of money into a bottomless well. We have had astounding help from the Dominions, Colonies, and Dependencies. This has been granted, officially and privately, without pressure, and with a noble recognition ot fealty. We cannot go back to the old relation of Mother Country and Colonies. Our kindred beyond the seas have earned a place of equality; they have proved their manhood, and we must, in wisdom as in justice, grant at full value their right to a share in all that is meant by British Imperialism. If therefore expediency and desire require some rearrangement of fiscal conditions, principles must be readjusted; there is need for some unity in regard to tariffs. Some of the Dominions have severely protective duties; in others, the Customs rates are determined with regard only to revenue, and, as we have said, it is important that the compromises made shall be voluntary and as complete as possible. The Royal Colonial Institute has been giving consideration to this question, and, failing Government action, propose an unofficial conference of representatives from the Dominions in London. Greater good, however, would accrue from Government action in association with institutes, chambers of commerce, and other similar organisations, particularly in the preliminary investigations.

IMMEDIATE AND WIDE-SWEEPING ACTION.

The need for immediate and wide-sweeping action with the Dominions, Crown Colonies and Dependencies is further justified by the probability that there will be some international action amongst the Allies in order to ensure that there shall be the maximum correlated assistance towards recovery from the ravages of war. The Central Powers, with that remarkable degree of organisation in anticipation of events which distinguishes them, are already at work in order to organise an immense Customs zollverein, from the Baltic to the Ægean Sea, and to embrace also such small neutral Powers as can be persuaded or forced to enter it. Obviously this aggressive step for peace time must be counteracted if the balance in trade is to be maintained. Mr. B. H. Morgan, in an address delivered recently at the Bristol Branch of the Royal Colonial Institute, indicated that the Royal Colonial Institute favoured the institution of an international commercial union to ensure co-operation between the Allies. Such a measure is feasible, and, from many points of view, commendable. Our Allies, like ourselves, will certainly have a great debit to counter-balance, and it is therefore permissible, as well as prudent, to arrange for future action to bring about readjustment on the credit side. As Mr. Morgan pointed out, the British Empire will experience great difficulties in entering a conference for the arrangement of an international commercial union unless there is within the Empire some approach to that uniformity which is realised in the fiscal arrangement of the European countries with whom we are allied. This, in itself, may justify action; but, apart from this, we are satisfied that a great effort ought at once to be made to ensure a greater commercial unity within the British Empire, and, further, for co-ordinating effort to achieve the maximum measure of industrial development and of independence for supplies, whether for peace or defence in the future.

ENFORCED TRADING WITHIN THE EMPIRE.

The same journal says: For the achievement of the threefold purpose—Imperial independence of supply, restriction of foreign aggrandisement under a commercial cloak, and closer trading unity—the first preliminary is undoubtedly a complete and definite classification of Imperial needs and existing sources of supply. For this work investigation ought to be at once instituted independently in each of the Dominions, India, and Crown Colonies; and in order that there should be some approach to uniformity the Secretary of State for the Colonies should define clearly the information desirable, so that later, when an attempt is made at classification, there would issue a definite and clearly-expressed result. We are sure that information of such a character would make certain, as well as simple, the feasibility now of Imperial independence to an appreciable extent. The classification of the information should be followed immediately by a united conference, representative of all the Dominions, India, and Colonies, to ascertain to what extent development is required in order to reap full advantage from natural wealth and existing sources of supply. There are two methods of encouraging such development: a most commendable one is to make it imperative that all public demands for material and manufacture must be supplied from Imperial sources. In the past there has been less regard paid to permanent Imperial gain than to the immediate advantage of the individual corporation or Government. Many instances might be quoted where, for a slight percentage of increased cost—and that probably only apparent because of difference in quality—orders have been placed with foreign companies which should have gone, with great advantage, to Imperial suppliers. We do not wish, however, to pillory any Government or any public authority, far less any firm, for such remissness; but it would be easy to point to industries which have been in some cases crippled, in others completely destroyed, by reason of this short-sighted and narrow-minded policy. Moreover, there are public works vital to the national weal at all times, and particularly during the present crisis, which have been greatly delayed because orders were placed with foreign firms to save a small fraction of the total cost involved. There is no justification for this, because the number and extent of manufacturing facilities in Great Britain are quite sufficient to ensure adequate competition in order to adjust the fairness of all prices asked and given. Such regulation regarding patronage must go hand in hand with greater restrictions regarding the institution of purely foreign establishments within our gates. But here, as in other phases of the question, there is ueed for careful discrimination and wise judgment. The dominant aim is to ensure the expansion of Imperial industries, and it is conceivable that in some respects this can best be achieved by encouraging foreign enterprise within the Empire. At the same time it is incumbent upon those responsible to see that such action does not result in political propagandism, or in such restrictive measures as are inimical to the widest and best interests of the Empire.

WRIGHT'S ROPES.

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

The Karroo Coal Controversy.

DEFINITION OF COAL REQUIRED.

Sir,—In your issue of the 15th inst. Mr. Arthur L. Chambers states that: " Coal of excellent quality has now been found in the deepest part of the Karroo basin, with the strongest evidence of the existence of coal measures extending over a very large area. That it is coal has been absolutely and definitely proved, and prospecting has established the fact that it comes from below, having by distillation and pressure been forced into the extensive lines of fissuring where it is now found." Would Mr. Chambers kindly furnish the readers of your journal with a definition of the word " coal "? About two years ago the writer was asked to inspect and report upon some so-called coal prospects in the Riversdale district of Cape Colony, where there occurs a mineral of apparently similar origin to the carbonaceous material to which Mr. Chambers has called the attention of the public. In one instance a ravine cut a succession of fissure deposits at right angles and exposed a number of carbonaceous veins varying from a few inches to two feet in width. The carbonaceous material when carefully picked had a low ash content, but owing to the irregularity of the veins it would have been almost impossible to mine it without an admixture of large quantities of soft sandstone. It decrepitated on heating and was difficult to ignite. Neither in mode of occurrence nor in physical characteristic did it bear any resemblance to what is generally accepted as coal. Several adits had been driven into the most promising deposits at the time of the writer's visit, but for a number of reasons he was unable to recommend further expenditure on what had been termed a promising mining venture. Many thousands of pounds have been spent in search of an answer to the question, " What is coal?" but in the opinion of the writer who has given considerable attention to the origin of hydrocarbon minerals the material found in veins in the Riversdale and Heidelberg districts would not be regarded as coal either from a legal or a scientific standpoint in any European country. Mr. Chambers refers to the source from which the fissures have reached their filling, suggesting that beneath the veins of carbonaceous material lies a main seam whose existence may be proved by boring. There are instances where igneous intrusions have driven off the more volatile constituents of a bed of coal and have left a workable mineral which in hardness, general appearance, and composition is very similar to coke, but large deposits of natural coke are rare, and to the writer's knowledge have only been mined with profit in two or three instances. It is probable that the gilsonite of Utah—the albertite of Nova Scotia, and other valuable hydrocarbon vein fillings of similar origin (not necessarily similar composition) to the vein hydrocarbons of Cape Colony have been derived from the distillation of shales containing but small quantities of volatile matter. In the Riversdale and Heidelberg districts may be seen shales which contain appreciable quantities of volatile hydrocarbons, though they can scarcely be described as oil shales. Evidences of igneous intrusions are found in these districts, and it is possible that the hydrocarbons found in the fissures was derived from the distillation of shales which are practically incombustible and which bear no resemblance whatever to what is generally accepted as coal. On the economic importance of the discovery of coal in the Karroo there should be no argument, but from a scientific standpoint it seems desirable that there should be given details regarding the mineral which Mr. Chambers believes to exist over a stretch of country twenty miles in length. What are the physical and chemical characteristics of the mineral? Does it decrepitate on heating, and is it soluble in ether or carbon bisulphide? As a simple test of its economic value, will it burn in a domestic firegrate or locomotive boiler? I should be pleased to have information on these points and also a clear and definite answer to the question, " What is coal?"—Yours, etc.,

STANLEY NETTLETON.

P.O. Box 41, Springs.

Unhealthy Conditions in the Mines of the Rand, and the Effect on Working Costs.

Sir,—At the September, 1913, meeting of the Chemical, Metallurgical and Mining Society of South Africa, I read a paper on " The Ventilation of the Mines of the Rand; the Problem of Obtaining Healthier Conditions." This paper dealt fully with the conditions which obtain in the mines of the Rand and showed why it is that ventilation by means of an exhaust fan at the surface fails to achieve a beneficial result. I advocated pumping air from the surface to the workers at the various faces, through pipes, by means of a blower; and gave an estimate of the cost of such an installation. The discussion of my paper, although it extended over several meetings, was very disappointing, for practically only side issues were raised. One speaker said it was not practicable to pump air to the working faces through pipes; he advanced no reasons in support of his statement. Of course, there have been people from the time of Stevenson's locomotive to the aeroplane who have made similar bald statements. However, I have done so in three instances with satisfactory results both as to cost and ventilation of the mine workings. Recently the Copper Queen Mine at Bisbee, Arizona, has adopted forced ventilation for the whole property. The engineers there are thoroughly familiar with coal mining practice, the same company owning the Stag Canon Collieries. Further comment is needless. While my paper was under discussion at the Chemical, Metallurgical and Mining Society I was told by several people connected with various mines that spraying and fan ventilation had solved the problem of miners' phthisis, and that anything further in the way of ventilation was quite unnecessary, and yet we are told in the daily papers there is still vast room for improvement. To-day it is generally admitted that miners' phthisis among the miners of the Rand mines is quite as prevalent, if not more so, than at any period. Engineers who are acquainted with the various devices which have been tried to precipitate fine dust in smelting furnace gases have known all along that if all the regulations for spraying underground were strictly carried out they would not lessen the amount of fine dust in the atmosphere in the mines. Spraying will only affect the coarse particles of dust, also the greater portion of the fine dust contained in the underground atmosphere is caused by blasting. The annual report of the Mines Department, 1912, states: " If health conditions were improved, better men would compete for the comparatively high wages on the Rand; both white and coloured men would put in a better day's work, and it is reasonable to suppose that more intelligent men would tend to reduce the accident rate. If these arguments were considered insufficient from a humanitarian point of view, it might be further urged that improved health conditions, by bringing better and more efficient miners, might tend to actually reduce working costs and cause larger profits to be made. Working under unhealthy conditions, the efficiency of the skilled miner must remain low, and a larger number of persons must be employed to do a certain amount of work than would be under normal conditions. As regards white miners, the skilled miner with all his faculties clear and in working order breaks more ground and uses less explosives than a mere labourer, and the difference between placing holes rightly or wrongly is very great indeed, and has a far-reaching effect, not only on the immediate output from the mines, but on the future cost of timbering and supporting weakened excavations." Since the above was written, skilled miners in the Rand mines have become fewer. The dread of this fell disease causes all hands, officials as well as miners and labourers, to come up from underground at the earliest possible moment. Is it therefore surprising that the cry is for more "boys" and still more "boys," so that the required daily tonnage for the mill shall be broken as quickly as possible. In the annual report of the Mines Department, 1912, quoted from above, occurs the following: "If health conditions were improved better men would compete for the comparatively high wages on the Rand: both white and coloured men would put in a better day's work." To make the significance of this statement clear to the lay mind, it should be said that many engineers on the Rand who are competent to judge consider that if health conditions were improved the number of workers underground, both white and coloured men, eould be reduced by one-third and still maintain the tonnage output of ore. To reduce the foregoing to figures, it means that better health conditions would reduce the eost of mining from two to four shillings per ton. On the present tonnage output this represents a sum of from £2,500,000 to £5,000,000 per annum. The present unhealthy conditions at the Rand mines, which conditions are remediable, mean an annual loss to the Shareholders of from £2,500,000 to £5,000,000! Unless health conditions are improved, mining costs will increase; if they are improved—and they can be—there will be a reduction in the immediate future of from two to four shillings per ton of ore, and this reduction in mining costs will increase later on as the underground officials and skilled miners "with all their faculties clear and in working order," devote their brains and experience to effecting economies. The gold mining industry of the Rand has a very long life before it, and this life will be further prolonged if mining eosts are reduced. Such a reduction is possible that gold-bearing rock can be worked at a profit which has at present no commercial value. Not only do the health conditions of the Rand mines affect the lives of the underground workers and the shareholders' pockets—they have a very great influence on the future development of South Africa.—Yours, etc.,

G. H. BLENKINSOP.

Specimen copies of the *South African Mining Journal* can be had from our Agents, Argus South African Newspapers, Ltd., Byron House, 82-85, Fleet Street, London, E.C.

Rooiberg Minerals Development Co.

The report of the Rooiberg Minerals Development Company shows that profits during the quarter ended December 31 totalled £6,233 2s. 11d., and that the average price per ton of metallic tin on which the quarter's revenue was determined was £162 4s.

S.A.
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1915.

BY S. R. POTTER
(Editor, "S.A. MINING JOURNAL")

Vol. I.

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PERSONAL.

Professor Yates opens the new session for mine officials at the Mining Institute to-day.

* * * *

Mr. J. H. Crosby, who has been so closely identified with the Robinson group of mines for nearly twenty years, is severing his connection therewith at the end of the month.

* * * *

A general meeting of members of the Transvaal Manufacturers' Association will be held on Monday next, 31st inst., at 4 p.m., in the board room, Cullinan Buildings, to consider the report of the Executive Committee, and also to consider the action to be taken for the protection of the interests of local manufacturers in view of the coming Parliamentary session.

* * * *

The annual meeting of the Geological Society of South Africa will be held on Monday next, the 31st January, at 8.30 p.m. in the Council Chamber of the Chamber of Mines. Dr. W. A. Rogers, the retiring President, is specially coming up from Capetown to deliver his presidential address, which will deal with the interesting subject of the nature of the copper deposits of Little Namaqualand, and it is hoped that there will be a full attendance of members and visitors to whom the meeting is open.

Two thousand natives in the State Mines compound at Brakpan, at the instigation of a number of disaffected Xosas, decided to refuse work on Monday. The Xosas demanded the dismissal of a compound manager against whom they had a grievance. A police inspector, with units from Benoni and Boksburg, was at the mine early and addressed the natives. The turbulent section was cowed, and the remainder admitted that they had no grievance, and all went to work.

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Another Big Order Out for Battery Spares—Imported Bar Iron Rapidly Advancing—Engineering Shops Busy—Second-hand Yards Have Big Variety But Small Stocks.

On Wednesday morning quite a mild sensation was created on the Commercial Exchange when one of the leading groups put out requisitions for a host of battery spares and parts of every description, from A to Z. This was similar to what happened last week when the market was cleared of crusher spares. These demands are altogether too big to be supplied locally, therefore it is expected that when the pulse of our market is laid bare, the mines might then issue other requisitions for the balance to be supplied from oversea. This definite procedure on the part of a group has given rise to much conjecture, chiefly that the controllers recognise the seriousness of the position as regards the shortage of shipping to South Africa both from Britain and America, therefore it is their duty to provide against future contingencies in that direction. The freight position is pretty well understood as to the British shipping being diverted to the Mediterranean, but not so with the American trade, as it appears that the New York boats prefer a short journey over to Liverpool in twelve or fourteen days, as they are sure of getting a full load of cargo each way, whereas it takes double the time to come to South Africa and it is not easy to get return freight to New York from here. The manager of a large importing house remarked, half in earnest and half in jest, that they would soon have to shut up unless shipments of iron and steel goods came forward more freely from Britain, as all mining material was being gradually absorbed and altogether insufficient came forward to replenish stocks. In the case of fencing, unmanufactured material, a cable arrived this week from London recommending that orders be sent for a twelve months' stock, as it was not only advancing in price but the day would come when manfacturers' stocks in Britain would not be available, to say nothing about the shipping difficulty.

Iron, Steel and Hardware Goods.

The price of bar iron has advanced 2s. 6d. per 100 lbs.; the lowest quote now is 20s. per 100 lbs., as compared with 17s. 6d.; the reason assigned is that pig iron has had a sharp rise in Britain. There is also an inclination for an advance in steel, in fact our standard list is on the lower side of prices, simply because quotations have become so irregular and it is difficult to give actual fine rates, as cables are so apt to alter rates a fraction from day to day, but never of late on the lower side, as the decided tendency is for a gradual rise in values. As regards galvanised iron and that class of goods generally, there is a feeling that values are decidedly on the up grade again, after a lull throughout the holidays. To illustrate in a slight degree what is happening, a small lot of second-hand, well-used flat galvanised was placed on a sale last week, when it fetched 1s. 9d. per sheet, much to the surprise of the auctioneer, who remarked that it was the highest price he ever obtained for such goods. In fact, the buyer was twitted on his "excellent" bargain. Mining picks have experienced a sharp rise in Britain of 50 per cent. within the last six weeks. The engineering shops are quite busy in repairs and making new parts for the mines. These shops, owing to the difficulty of obtaining machinery parts and special lines from oversea, are fulfilling a decided want, and now they are undertaking to supply cages and mining material that they would never have dreamt of before the war. The local iron works could sell double their output, therefore the mills are working under full pressure to catch up with the orders already in hand.

Timber and Building Materials.

The shortage of shipping and the unsettled feeling created in reference to Sweden's action over the curtailment in the export of wood pulp are disturbing factors on this side. Fears are entertained that it may eventually mean a curtailment of manufacturing doors, windows, frames and other builders' requirements at the factories, both here and at the coast ports, simply for the want of raw materials, and the price may attain to such figures that will certainly give a check not only to the wood factories but to building enterprise generally. The mines keep buying bulk timber that now the pick of the best pitch pine has risen to a fraction over six shillings per cube. Teak, jarrah wood, poplar, and other fancy lines, are anything but plentiful, hence the creeping up of values. Builders' hardware is much the same, as there has been no incentive to make any decided advance, as the demand is not at all active. Since the new year a good demand has sprung up throughout South Africa for the glazed drain pipes made at the Transvaal works.

The Second-hand Yards.

Never before in the history of Johannesburg have such varied assortments of all kinds of mining material and building oddments been gathered together in the numerous yards and storehouses. It would appear that the stocks have been sorted over for the best things so many times that odd lots of quite a second-hand nature are left. Anything in the shape of big lines is now becoming the exception and not the rule. The fact is that very few goods are coming into the yards, and on the other hand very few goods are going out, as the demand is slow and disappointing. Prices remain much the same, but every day they become more a matter of bargaining, chiefly because the lines are poorer after such overhauling, with less replenishing. As regards second-hand machinery and mine oddments, the quiet but constant demand from the Transvaal and Natal coal fields keep up the enquiries, but no great volume of business passes, because it is more or less difficult to supply just the things wanted, and it does not answer to send substitutes without much telegraphing or letter writing.

Antimony, White Lead, Paints, etc.

The phenomenal rise in antimony in Britain is owing to the demand for its use in the munition factories. It is used here in connection with the re-casting of linotype, as well as castings in foundries. The local price is now 2s. 9d. lb. as compared with 10d. before the war. The price of white lead, oils and paint materials has not advanced or altered lately, as cables have been few and far between since the New Year. However, the mail boats are of the greatest importance to-day, because the more and more they become erratic, the seriousness of the position will leave much to be desired as to our actual supplies on hand, and already we have entered the zone of anxiety, as stocks are worse to-day than ever they have been as regards quantities. An expert reckons we can last over about four months on present stocks, but even then substitutes, especially as to sizes, would of necessity have to be provided.

Trade Items Generally.

A firm handling commercial rubber states that this has been their best month so far, as the mines have been buying quite freely. The price is from 4s. to 5s. per lb. Rubber flex is so scarce that only a few yards can be had at any one time at 6d. per yard, practically as a favour. Paraffin has advanced 4d. per tin, chiefly because of the extra cost of the tins, as well as the freight charges. Cotton seed oil is almost unobtainable, even at the high rate of 53s. for 2/4 case. Extra business is looked for from orders in connection with sinking the new deep shaft at the Robinson Deep, also the new developments at the Daggafontein mine.

Revised Price List.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 20s., 22s. 6d. and 25s. (local do., 15s. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 3d. lb.; drill, 5¼d. lb., tool, 7½d. to 9d. lb.; steel plates, 10ft. x 4ft. x 1-16in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 7d. lb.; over 3 in., 6d. lb.; ½ in. up to 2 in., 45s.; 2¼ in. to 6 in., 40s.; 6½ in. and over, 37s. 6d.; ⅝ in. up to 2½ in., 35s.; 2¾ in. to 6 in., 32s. 6d.; 6½ in. and up, 30s.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 30s.; 2¾ in. to 6 in., 29s.; 6½ in. and up, 28s. per 100 lbs. Nuts, ⅜ in., 7½d. lb.; ½ in., 45s.; ⅝ in. to 1½ in., 42s. 6d.; 1⅝ in. to 1¾ in., 47s. 6d. per 100 lbs.; 2 in., 6d. per lb.; washers, ¾ in. and under, 25s., and above that size, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £15½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 8¾d., 11 ft. 9⅛d., 12 ft. 9½d.; 26 gauge, 6 ft. to 10 ft., all lengths about 7d. to 7½d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 31s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. 6d. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9x3, up to 16ft., 9¾d.; over, 10½d. to 11½d. (Oregon, 10⅛d.); flooring, 4½x⅞ and 6x⅞, 5d. to 5½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 10d. to 6s. 1d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7¼d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 9d. per cub. ft.; do., large, 15s. 9d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland 8s. 3d. per bag; 7s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport now normal; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 25s., boiled, 25s. per 5 galls.; white lead, 58s. to 60s. per 100 lbs.; turps., 50s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 21s. to 22s. 6d.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 4s. per 12½ lb. bladders, 25s. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s. 4d. 2/5; petrol, 23s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 7s. 6d. lb.; alum, 9d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay), 57s. 6d., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 14s. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. per yard; 3/20 coils of wire, 27s.; do., 3/22, 23s.; tubing, 12s. to 13s. 100 ft.; keyholders, 1s. 9d. each; round blocks, 3½ in., 3s. 6d. doz., local; lamp holder cord grips, 9s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 15s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

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(Incorporated in the Transvaal.)

DECLARATION OF DIVIDEND No. 29.

A DIVIDEND of 7½ per cent. (One Shilling and Sixpence per share) has been declared by the Board for the period ending 31st January, 1916, payable to shareholders registered in the Books of the Company at the close of business on 31st of January, 1916.

The Transfer Books will be closed from the 1st to the 7th of February, 1916, both days inclusive.

It is intended to post the warrants in payment of this Dividend on or about the 3rd of March, 1916, but irregularity in the mail service may render it necessary to defer the posting by one or even possibly two weeks.

By Order of the Board.

Transvaal Consolidated Land and Exploration Co., Ltd.,
Secretaries.
L. G. HEARD, Business Manager.

Head Office: The Corner House,
Johannesburg, 26th January, 1916.
28227

The Only Real Safeguard.

The *Melbourne Age* for October 18th says:—"Whilst the importation of enemy goods into the Commonwealth is prohibited by law, the Minister of Customs admits that very little check can be exercised regarding the introduction of enemy goods made in neutral countries. With a view to minimising trade of this class, the department is requiring that any goods which might be suspected of being of enemy origin must be accompanied by a certificate from the British Consul that they were manufactured in the neutral country from which they were exported."

RAND MINES, LIMITED.

(Incorporated in the Transvaal.)

NOTICE.

OWING to the irregularity of the present Mail Service it is notified that the Dividends declared by the following Companies on 14th December, 1915, will not be posted before 10th February, 1916.

COMPANY	DIVIDEND No.
Modderfontein B. Gold Mines, Ltd.	**7**
New Modderfontein G.M. Co., Ltd.	**19**
Rose Deep, Ltd.	**29**
Geldenhuis Deep, Ltd.	**32**
Nourse Mines, Ltd.	**23**
City Deep, Ltd	**7**
Village Deep, Ltd.	**15**
Robinson G.M. Co., Ltd.	**47**
Crown Mines, Ltd.	**29**
Durban Roodepoort Deep, Ltd.	**12**

By Order of the Board,

27th January, 1916.
S. C. STEIL, Secretary.

THE WEEK IN THE SHAREMARKET.

Brisk Business in Specialities—Broadening Tendency—Effect of Excellent Native Labour Supply.

ALTHOUGH the market has been quieter than in previous weeks, there has been considerable business at increasing prices in several stocks. All the "C.M.S." stocks have been active, in sympathy with the Far East Rand district in general. The Daggafontein scheme has encouraged shareholders in neighbouring ventures, and it is thought that the money may be found privately for the development of other properties in the district. The excellent native labour supply should soon be reflected in returns, and is, indeed, the brightest feature of the industry at the moment. It means that the position of the ore reserves of many mines can be greatly strengthened. Towards the end of the week the whole market firmed up, and the prospects for steadily increasing business are most satisfactory. Tins, despite the good price for the product, are dull; but the smaller diamond shares have again come in for demand on the revival of the large producers and the talk of a big fusion of interests.

	Friday. 21st.	Sat. 22nd.	Mon. 24th.	Tues. 25th.	Wed. 26th.	Thurs 27th.
African Farms	8 6*	8 3*	8 3*	8 6	8 6	8 6*
Apex Mines	5 3*	5 3*	5 3*	5 3*	5 3*	5 3*
Aurora Wests	9 0*	—	8 6*	8 6*	8 6*	8 6*
Bantjes Cons	8 0†	7 6A	7 0*	7 9*	7 3*	8 0A
Brakpan Mines	68 0*	68 0	67 0*	67 0*	69 0A	—
Breyten Collieries.	20 0*	—	20 0*	20 0*	20 0*	20 0*
Brick and Potteries	5 0*	—	5 0*	—	5 0*	—
British South Africa	—	—	—	10 0*	10 0*	10 6*
Bushveld Tins	—	—	—	—	0 3*	0 3*
Cassel Coals	—	19 6†	—	—	—	19 6†
Cinderella Cons.	—	—	—	4 6	—	4 6*
City and Subs.	—	—	35 6*	—	34 6*	34 6*
City Deeps	75 0A	74 0*	75 0	74 3*	74 0	74 0
Cloverfield Mines	7 6*	7 9	7 8	7 7	7 6*	7 8
Clydeadale Collieries	13 0*	—	14 0†	—	—	—
Concrete Construction	—	1 9†	—	1 6†	—	1 0*
Con. Langlaagtes	—	34 0*	34 0*	34 6	34 6†	34 6†
Con. Main Reefs	18 3	18 0*	18 0*	18 4*	18 0*	18 4½
Con. Mines Selection	14 0*	14 0†	—	14 0	14 0*	—
Coronation Collieries.	25 0*	25 0*	25 0*	25 3*	25 3*	25 3*
Coronation Freeholds.	—	—	—	0 3*	—	0 3*
Coronation Synd.	—	—	—	—	2 0*	—
Crown Diamonds	2 6†	2 0*	2 0*	2 0*	—	2 6†
Crown Mines Deb.	—	£100†	—	—	—	—
East Rand Centrals	3 9*	3 6*	3 8*	3 10†	—	3 4*
East Rand Coals	2 7*	2 6*	2 6*	2 6*	2 6*	2 6*
East Rand Deeps	1 9	1 7*	1 8	1 7*	1 7*	1 8*
East Rand Minings	10 6	—	10 3†	10 3†	9 6*	9 3*
East Rand Props.	19 0*	17 6*	18 0*	18 3*	18 3*	18 0*
East Rand Deb.	£77½*	£77½*	£77½*	£77½*	—	£77½*
Eastern Golds	1 6*	1 6*	1 7	1 6*	1 6	1 7†
Ferreira Deeps	38 9†	—	—	—	—	—
Frank Smith Diam.	2 6	2 6	2 10	2 9	2 7	2 7
Geduld Props.	37 3	36 6*	36 9	36 6*	36 0	35 6*
Glynn's Lydenburgs	8 6*	8 6*	10 0†	10 0†	10 0†	—
Goerz and Co.	12 0*	13 0†	—	—	—	—
Govt. Areas	31 6A	30 3	30 6	30 6	—	30 9
Jupiters	7 3*	7 0*	7 0*	7 3†	6 6*	6 9
Klerksdorp Props.	—	—	1 6*	—	—	1 6*
Knight Centrals	11 10	11 6*	12 9	12 9	12 5	13 6*
Lace Props.	5 4	5 0*	5 0*	4 9*	4 9	4 11*
Luipaardsvlei Est.	—	7 6	—	7 6*	—	7 6*
Lydenburg Farms	6 6	6 6*	6 6*	6 7*	6 7*	7 0
Main Reef Wests	6 9*	7 0	7 0*	7 0*	6 9*	6 10*
Meyer and Charltons	97 6*	97 6*	97 6*	97 6*	97 6*	—
Middelvlei Est.	—	1 3*	—	1 3	1 3*	1 4*
Modder B.'s	115 6*	116 0†	114 3*	115 0	115 0*	115 0*
Modder Deeps	116 0*	116 0*	113 6	113 9	—	116 0
New Boksburgs	—	—	1 3*	1 9†	1 3*	—
New Eland Diam.	14 0†	14 0†	—	—	12 0	—
New Era Cons.	7 3*	7 3*	7 5*	7 6	7 3	7 3*
New Geduld Deeps	3 7*	3 9†	3 6*	3 6	3 4*	3 4*
New Gochs	—	—	—	14 0†	—	—
New Heriots	—	—	—	52 6†	50 0*	51 0*
New Kleinfonteins	30 3	29 3*	29 3	29 0	28 0	28 0
New Modders	312 6†	302 6*	310 0†	310 0†	310 0*	305 0*
New Unifieds	—	—	—	13 6†	13 6†	—
Nigels	—	—	—	5 0†	—	—
Nourse Mines	17 0†	15 0†	15 0†	15 0†	13 9	—
O.F.S. Diamonds	—	0 3†	—	—	—	—
Pretoria Cements.	47 0*	47 0*	—	—	51 6*	51 6*
Princess Estates	3 6*	3 6*	3 6*	3 9	—	3 6*
Rand Collieries	3 3*	—	3 0	3 3*	—	—
Rand Klips	6 5	6 1	6 1*	6 0	5 6*	5 8
Rand Nucleus	2 4	2 5*	2 5*	2 2*	2 2	1 11*
Randfontein Deeps	3 1*	3 0*	3 0*	3 1*	3 0*	3 0*
Randfontein Est.	12 0†	11 0*	—	—	—	—
Roberts Victors	11 0A	11 0†	—	—	—	—
Rooibergs	12 6*	12 6*	12 6	—	12 0*	12 0
Roodepoort Uniteds.	6 9*	6 9*	6 9*	6 9*	7 0	7 0
Ryan Nigels	2 0*	2 0*	2 0*	2 0*	—	2 3*
Shebas	1 0*	1 6	1 0*	1 6†	1 6†	1 0*
Simmer Deeps	2 0*	2 0*	—	2 0*	—	—
S.A. Breweries	—	31 6†	31 6†	31 6†	31 0†	—
S.A. Lands	3 11*	3 8	3 8*	3 7	3 5*	3 6
Springs Mines	42 0	41 0*	41 3*	40 6*	40 0*	41 0
Sub-Nigels	12 0	12 0*	12 0*	12 0*	11 9*	11 6*
Transvaal Coal Trusts	50 0*	50 0*	50 0*	51 0	50 6*	50 6*
Transvaal Lands	11 0*	11 0*	11 6*	12 0	12 0*	12 0*
Trans. G.M. Estates	25 6*	25 6*	26 0†	—	—	—
Tudors	2 0†	—	2 0†	2 0†	2 0†	2 0†
Van Dyks	—	—	—	3 9†	—	—
Van Ryn Deeps	60 0	58 6*	59 0*	58 6*	58 6*	59 6
Village Deeps	36 0†	36 0†	—	33 0*	33 0*	36 0*
Vogel Con. Deeps	1 7*	1 6*	1 5*	1 6	1 6	1 5*
Welgedachts	15 0*	—	15 0*	—	—	16 6
West Rand Cons.	—	—	8 6*	8 6*	—	8 6*
Western Rand Est.	1 0*	1 0*	—	1 0*	1 0*	1 0*
Witbank Collieries	—	—	38 9*	40 0*	40 0*	—
Witwatersrands	52 6	53 0*	53 6*	54 0*	53 6*	54 6†
Wit. Deeps	22 0	—	21 9*	—	22 0	21 9*
Wolhuters	9 9*	9 11	9 11	9 9*	9 9*	10 0
Zaaiplaats Tins	9 9*	10 0	10 6	10 3	9 6*	9 3*

* Buyers. † Sellers. A Odd lots.

NOTICE: To Mine Managers & Others

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Engineering Notes and News.

Forty Thousand Horse Power.

The large steam turbo-generator recently installed at the Waterside station of the New York Edison Company has a capacity of 40,000 horse power. It is large enough to furnish power for two Dreadnoughts, or for several ordinary cities. A turbo-generator is a steam turbine engine and an electric generator mounted on the same shaft. In plainer words, it is a mechanical device to change steam energy into electrical energy so it can be distributed over copper wires to where it is needed for power and light. In order to realize the tremendous power of this particular turbine, you must imagine 40,000 large truck horses hard at work. This tremendous piece of machinery is 57 feet long, 20 feet across and 14 feet high, and its vitals are protected by solid steel castings, giving it a total weight of 957,000 pounds. Station No. 2, of the Waterside group, houses the new unit which was installed in the space formerly occupied by two turbines of smaller capacity. This machine was built especially for the New York Edison Company by the General Electric Company at the Schenectady works. To members of the electrical industry it is known as a 30,000-kw. ten-stage, high-pressure turbine of the Curtis type. The set consists of a ten-stage, high-pressure turbine and a two-stage, double-flow, low-pressure turbine on the same shaft. Steam that drives the high-pressure blades exhausts into the low-pressure turbine, where whatever is left of its energy is utilized. From this chamber it exhausts into the condenser and becomes impotent water once more. The turbine operates at 1,500 revolutions a minute and the peripheral speed of the low-pressure buckets is more than nine miles a minute. Steam is supplied through 16 valves at the front of the unit, at a pressure of about 185 pounds to the square inch. The condensing system necessary to handle this tremendous amount of steam is of the surface type, and it is estimated that there are about 50,000 feet of cooling space in the compact apparatus. The condensing is accomplished with river water through the assistance of a 75,000-gallon pump. But although this great machine is generating enough force to drive several large steamships, its operation is almost soundless. Aside from the soft hissing of the imprisoned steam, only a steady drone is heard.

Economy in Mechanical Stoking.

In the *Engineering Magazine*, Mr. Clarence Coapes Brinley shows how the automatic stoker is effective in reducing costs in labour and fuel, and how easily it can be operated to handle more than a ton of coal per hour with any degree of efficiency. For this reason hand-firing requires one fireman for about every 600 or 700 horse-power. When mechanical stokers are used in conjunction with mechanical handling equipment, one operator can handle from 5,000 to 6,000 horse-power. The burning of low-grade coals with efficiency is made possible by the regular and continuous feeding of the coal into the furnace, and the constant and even air supply which is the result of minimising the necessity of opening the furnace door. But the best results from burning low-grade coals are obtained with those stokers which employ forced draught. Since the capacity of any boiler is limited by the amount of coal that may be burned in its furnace and by the efficiency with which this coal is consumed, it is obvious that a greater amount of coal can be burned over the same grate area, in a mechanical stoker, and at a higher efficiency, than is possible in a hand-fired furnace. But an increase in boiler capacity is economical only within certain limits. Increased capacity means increased maintenance costs, and where firebrick arches are used, it is not considered good practice to operate above 150 per cent. of rating. If boilers can be operated at such rating by mechanican stokers, then it requires, for a given capacity, only half as many boilers as would be needed with hand-fired furnaces. The saving in space and boiler equipment will therefore compensate the cost of stoker installations. There are two so-called scientific methods of burning coal in furnaces, and these are responsible for the development of three distinct types of mechanical stokers—the chain grate, the over-feed, and the under-feed. The first method, progressive combustion, requires that the green coal be fed gradually and regularly into the edge of the fuel bed at the front of the furnace. Here the coal is coked, and the volatile gases are distilled. These gases, mixed with the proper amount of air, move across the incandescent fuel bed, and are consumed before leaving the combustion chamber. The coked coal is then advanced to finish its combustion, and forms an incandescent bed to consume the gases from the fresh coal which has taken its place. This progressive movement is continued while the fixed carbon is being consumed and the ashes are being deposited at the rear of the grate. This method is employed in both the chain-grate and over-feed types of stokers. The second method, under-feed combustion, requires that the green coal be forced on to the grates underneath the incandescent fuel. Here the coking process takes place, and the volatile gases pass up through the incandescent fuel, and are consumed before leaving the fire. The coked coal is then forced up by fresh coal entering from below, completes its combustion, and forms an incandescent fire to consume the gases from the coal. This method is employed by the various types of under-feed stokers. The author proceeds to describe the leading types of mechanical stokers now in the market, showing the differences of each type, the different makes of the leading manufacturers being taken as examples. The author says that among the points to be considered in choosing a stoker are: The initial expenditure involved, the cost of operation, and the maintenance charges. The over-feed stokers average roughly about five, chain-grates about six, and under-feed stokers about seven dollars per rated boiler horse-power. For the under-feed type this includes the forced draught system. The operation of the fan and the rams for an under-feed stoker consumes about 2½ per cent. of the steam produced by the boiler. For the over-feed type and the chain-grates less than 1 per cent. of the steam produced is consumed in operating the stoker. The maintenance charges will be affected largely by the number of moving parts that come in contact with the incandescent fuel. In the chain-grate we have the maximum number of such parts, and in the under-feed stokers the minimum. In the under-feed stokers there is always a layer of green coal between the grates and the incandescent fuel, which protects them from the heat of the furnace. Replacing or repairing burned out firebrick arches is the most costly item in furnace maintenance, and these arches are not required with underfeed stokers, the fuel bed being directly beneath the heat-absorbing surfaces of the boiler.

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BALL BEARINGS.

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The best "Reef Traveller" is the *South African Mining Journal.*

THE SOUTH AFRICAN
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CONTENTS.

PAGE
Notes and News ... 523
Topics of the Week:
  The Coal Industry and Railways ... 525
  The Progress of Mining in Rhodesia ... 526
Rand Mining Figures for 1915 ... 527
Manicaland Gold Production in 1915 ... 528
Position of the Cape-Cairo Oil Company ... 529
Gold Market in 1915 ... 529
Rand Metallurgical Practice.—III. ... 530
Correspondence and Discussion: " Mine Regulations," " The Diamond Fusion," " Karroo Coal Controversy," " Chemists and War Munitions " 531
New Coal Dust Experiments.—V. ... 533
Rhodesian Section:
  Rhodesian Mineral Output for December ... 535
Commerce and Industries ... 538
Engineering Notes and News:
  The Distribution Plant of the Johannesburg Municipal Electric Supply System ... 542
The Week in the Mining Material and Engineering Trade ... 539
The Week in the Sharemarket ... 541
Company Meetings: Randfontein Central Profits, Randfontein Estates, Langlaagte Estates, Witbank Colliery, Gold Mines Investment Co., Ltd., Piggs Peak Development, New Transvaal Chemical ... 544

Notes and News.

Prospecting Activity at Heidelberg.

A prospecting party, under influential auspices, left one morning during this week for the Heidelberg district to peg off an area of claims. It is noteworthy that there has been a considerable increase in the number of claims pegged in that district of late, the official returns of the Mining Department for December showing an increase from 5,283 at December 31, 1914, to 7,366 at December, 1915. Only in the Pietersburg district has there been a similar rise for the year.

* * * *

Modder Deep and Geduld Ore Reserves.

In their quarterly report the directors of the Modderfontein Deep state that the ore reserves at December 31st were 2,670,000 tons, assaying 8·3dwts. over a stoping width of 73 inches, as compared with 2,450,000 tons, assaying 8dwts. over a stoping width of 69 inches at December 31st, 1914, showing an increase of 220,000 tons in the reserves, of ·3dwt. in the value, and of 4 inches in the stoping width. The directors of the Geduld announce that the ore reserves at December 31st, 1915, were 2,100,000 tons, assaying 7·7dwts. over a stoping width of 59½ inches, as compared with 1,900,000 tons, assaying 7·1dwts. over the same stoping width at December 31st, 1914, showing an increase of 200,000 tons in the reserves and ·6dwt. in the value.

* * * *

Robinson Deep, Ltd.

Owing to the severe pressure of ground, it has been found that the timber, steel and reinforced concrete used as supports, are yielding in Shaft No. 2, both in the vertical and incline. It is not known as yet to what extent the pressure may be arrested. It is hoped that the quantity of ore milled per month will not be decreased below 45,000 tons for the months of February and March.

* * * *

New Transvaal Chemical.

Satisfactory results are shown for the first year's working of the New Transvaal Chemical Company since the arrangement made with Lever Brothers. The profits on trading amounted to £36,300, which compares with £27,300 in the previous twelve months, and in addition £22,500 was received from interest on investments. The latter presumably represents the return on the company's holding of £150,000 in Lever Brothers, and as against it there is the increase in its own capital. The full dividends of 6 and 8 per cent. are paid on the First and " A " Preference shares, which represent the old Participating Preference and Ordinary respectively, and a dividend of 8 per cent. is declared on the new Ordinary shares, leaving £1,200 to be carried forward. A full report of the annual meeting appears elsewhere in this issue.

* * * *

The Diamond Market.

While from the nature of the existing conditions an active market in diamonds is not to be expected, yet business is far from being dead, says the *Financial News*. As regards proportions, the trade is merely a shadow of its former self. Conditions, nevertheless, are improving, and holders of De Beers have doubtless learned with satisfaction that preparations for washing blue ground on a limited scale are in progress. This, together with inquiries reaching the market from different quarters, indicates a " certain liveliness," which, it continued, will enable us to resume our reports concerning the trade in the stones. It will be generally recognised, of course, that, owing to the condition of affairs on the Continent, these reports cannot be so full as formerly. If company reports be compared with the statements made in our columns from time to time, it will be seen that our views have proved true in every respect. During the last week of the old year the trade with America in various kinds of stones was described as good.

Welgedacht and Cloverfield Fusion.

An amalgamation of the Welgedacht and Cloverfield properties has often been discussed in these columns, and a provisional agreement has now been signed for the amalgamation. Shareholders in the Welgedacht Exploration Company will receive share for share in a new company to be formed, while the Cloverfield Mines, Ltd., will receive 100,000 £1 shares in the new company. The working capital of the new company will be £75,000, to be raised by the issue of 75,000 shares of £1 each. These shares will be offered at par to the shareholders of the Welgedacht Exploration Company and the Cloverfield Mines. In addition, arrangements have been made to secure for the new company a loan of £200,000, repayable in three years, to be secured by debentures convertible during that time into ordinary shares at par. The debenture holders are to have a further option to take up 100,000 shares at 25s. in four years. Messrs. Barnato Bros. are also interested in the deal. The capital of the Welgedacht Exploration Company, Ltd., is £250,000 in £1 shares with 156,750 shares issued. It owns the freehold of the farm, while the mynpacht, etc., extend to 1,240 claims, being situated at the extreme east of the farm and some considerable varying distance from Cloverfield. There is a shaft down 724 feet. Between the two areas are some 2,350 claims, which might form the subject of a new State lease. It may be recalled that the original mynpacht was taken out on the western side of the farm, but permission was subsequently given to re-locate it. Ten years ago the reef was cut by a borehole in the centre of the mynpacht at 1,908 feet, giving 20 dwts. over 10 inches. Operations on the gold section were suspended in October, 1911. The capital of the Cloverfield Mines, Ltd., is £385,000 in £1 shares, with 355,000 issued. The company owns 799 claims, comprising the whole of the Cloverfield farm. The average value of the 5,400 feet of reef sampled during the year 1910 was 16·6 dwts. over 11½ inches, and the consulting engineer pointed out that this result itself could not be considered very satisfactory; but the details of the work indicate the existence of areas of good value. Operations were suspended in 1910. The company is upwards of £55,000 in debt.

* * * *

A Belated Phthisis Report.

There has just been issued the report of the Actuary to the Miners' Phthisis Board for the year ended July 31, 1914. It is only a Blue Book of a couple of dozen pages, but it is eighteen months old now. Owing to inadequate clerical assistance, the Actuary could not survey the work of the full year, and was only able to deal with a portion of the data in an exhaustive manner. The report throws a few interesting sidelights upon the phthisis problem. The statistics available when the Actuary drew up his report, indicated several differences between South African born miners and miners from oversea. South African born mine workers show a lighter phthisis death rate than oversea miners, and they also draw their compensation at an average earlier age. The Actuary suggests that the South African born men either give up underground work at an earlier stage of the disease than those born elsewhere do, or that their conditions of life thereafter are more favourable. "It would seem quite likely," he says, "that they may be able to drop into comparative retirement more readily and more pleasantly than those born elsewhere, as they have in most cases relatives in the country whom they can join, and whom in many cases they can assist in their less arduous work." The Actuary says he finds "that machinemen in very few cases seem to attain to any great age before contracting miners' phthisis, and that few of the South African born, even though not doing machine work, apparently do so either." As far as the assets of the miners are concerned, the experience of the Phthisis Board has been that oversea miners hold the larger percentage of insurance policies, whereas the South African born miners are more inclined to put their money into stands or farms. The proportion of married men is very much greater, and the average family is very much larger, in the case of those born in South Africa, than in the case of those born elsewhere. The ranks of the oversea born men still include a larger proportion of machinemen and skilled workers.

* * * *

Piggs Peak Development.

The Piggs Peak report for the year to March 31, states that the year's operations have resulted in a profit of £3,234, out of which £3,000 has been written off property and machinery account, and the remainder, £234, with the balance brought in, it is proposed to carry forward. Mining and milling.—A total of 34,169 tons of ore was obtained of an average value of 6.39dwt. Of this tonnage, 26,955 tons came from the old section and 7,214 tons from the new section. It has been found possible to treat locally the entire output of concentrates, resulting in an appreciable reduction of costs on the former method of shipping to England. Development.—The ore reserves as at March 31 last were estimated as follows: Old section, 8,640 tons, 5·0dwts.; new section, 9,621 tons, 8·7dwts.; total, 18,261 tons, 6·9 dwts. Although the expectation expressed by the superintendent that these figures will be considerably exceeded has been proved correct by the mining work carried out since March 31, yet the reduction in the total tonnage of the existing ore reserves makes the opening up of further payable ore bodies a matter of vital and urgent importance. Exploration of the lower levels, both in the old and in the new sections, was, unfortunately, greatly interfered with by the heavy rainfall during the first four months of 1915, which left the bottom levels unworkable. This difficulty has now been overcome by the installation of additional pumping plant, but it is only quite recently that it has been possible to proceed energetically with the development and exploration programme laid down by Mr. Sharpley, and approved of by Mr. McCarthy, the company's consulting engineer. It is intended in future to treat a larger percentage of ore from the new section, for which purpose some small alterations in the concentrating plant are being effected. The appearance and mineralisation of the several points at which exploration work is being carried out is encouraging for the finding of further ore bodies, and the superintendent strongly advises that the development work, which is at present in hand, should be vigorously continued. Farming.—The company's ranching operations have been extended by the purchase of thoroughbred stock.

* * * *

Gold Mines Investment.

The net profit for the twelve months earned by the Gold Mines Investment for its last financial year showed a slight improvement at £24,599, and with the amount brought forward there is a sum at credit of profit and loss of £45,087. Seeing that the profit is nearly all derived from income on investments the directors took counsel's opinion as to distributing a portion, but further heavy depreciation prevented such a course being adopted. Indeed, the depreciation is estimated at £90,782, and seeing that no less than £271,845, was written off under this head a year previously (wiping out the reserve fund and the credit balance) it will be seen that the company has suffered severely from the abnormal conditions prevailing. The schedule of the company's holdings has been extended, and it will be noted that £27,000 Treasury bills and £10,000 4½ per cent. War Loan now figure therein. The value of the investments in the balance-sheet is £422,784, as against £403,167, a year ago, the unquoted securities being valued at £94,296 as compared with £102,100.

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The Geological Museum.

In their annual report for 1915, the Council of the Geological Society of South Africa write: "Owing to the withdrawal towards the latter part of the year under review of the Municipal grant-in-aid to the Johannesburg Museum Committee, in whose charge the society's mineral collection has for some time been placed, it was necessary to dispense with the services of the Museum Curator, and but for the public-spirited action of the authorities of the South African School of Mines in arranging, free of charge, to keep the museum open for the benefit of visitors and to give information to prospectors and others who use the collection, the museum would have had to be closed. The history of the museum has been a chequered one, and it is a curious and humiliating anomaly that in a town such as Johannesburg it has so far been found impossible, in spite of repeated efforts, to enlist the practical sympathy of the Municipal authorities or the Government to provide a museum, with the necessary funds to maintain it, worthy of the centre of the greatest gold mining industry in the world, and of the commercial capital of South Africa. In this as in other matters Johannesburg has been too modest in its claims for educational purposes. It is the centre from which, directly or indirectly, the major part of the national revenue of South Africa is derived, and yet the needs of the population in all that pertains to higher education have been ignored by the Government. It is for the community to bestir itself, and see that it is no longer behind the smaller towns of the Union, which have their Museums, Art Galleries and University Colleges, supported largely by grants of money which the Government could not give were it not for the Witwatersrand gold mining industry. The Witwatersrand ought surely to get a share of its own money for such objects. The following specimens have been presented to the Geological Museum during the year 1915:—Presented by A. A. Auret: Rock from pipe "B2" with tin; tin-ore, pipe "B5"; disintegrated pipe matter; shed-tin; scheelite from tin-lode; all from Stavon Tin Mines, Oliphants River, Waterberg, Transvaal. N. V. Becket: Pyritic concretion, from Trichardsfontein, Bethal. P. van Breda: Corundum crystals, from Louis Trichardt; garnet (pyrope); corundum crystal; and garnet fragment, from Enkelput Mine. R. Cheney: Two specimens of malachite, from South-West Africa. C. Cooper: Calcareous conglomerate, from Kenhardt. D. Driesen: Chalcedony, from Geduld Mine. G. C. Fox: Two pieces of yellow ground, and one specimen cyanite-garnet rock, from the Roberts Victor Diamond Mine; collection of copper and zinc ores. W. W. Harris: Manganese ore supposed to contain gold, from Zoutpansberg. J. Kelly: Hematite, from Waterberg. H. C. G. Kinloch: Contact-garnet, from Pretoria District. A. H. Lloyd: Talc, from King Asbestos and Chrome Iron Co., Rhodesia; asbestos, from Regina Asbestos Mine, Victoria, Southern Rhodesia; prepared asbestos (hand-worked). P. Macadam: General geological table; representative section of Witpoortje. S. Nettleton: Calcite on zincblende, from 19th level, Nourse Mines. R. G. Rorke: Vesuvianite, from Waterberg; chalcedony, from Msibi Location, Potgietersrust; antimony-ore, from Selati; cobalt-ore, from Balmoral; copper and ankerite, from Boschkop, near Pretoria; garnet, from Vliege-poort, Rooiberg; cyanite chrome-mica rock, from Elandsfontein; steatite, from Hennops River; galena, from Knoppieslaagte; lime deposit, from Kalkheuvel. S. Ryan: Hematite pseudomorph after pyrite, from Kromdraai. W. A. Salomon: Two rock specimens containing cinnabar, from Hector Spruit. A. R. Sawyer: Several mineral collections. C. Treadwell: Uranium impregnation (?) on pegmatite, from Oliphants River. A. D. Viney: Flint chippings, from Kuruman River. M. Weber: Loellingite, pyrite and chalcopyrite, from Nylstroom.

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Bonus for Safety in Shaft Sinking.

The No. 3 Shaft of the Government Gold Mining Areas is being deepened approximately 170 feet, according to *The Reef*. Mr. J. L. van Eyssen, the manager, has arranged that 20 per cent. of the bonus payable over day's pay rates is to be retained and paid out at the end of the job on "Safety First" lines, on the following conditions: (1) That no serious or fatal injury be caused to anybody on the job; (2) that the Mining Regulations be faithfully observed; (3) that only those participate who work on the job from start to finish. The following irregularities will disentitle anyone to any part of the bonus:—(1) Breach of Mining Regulations; (2) insobriety; (3) unsatisfactory conduct; (4) late for work; (5) incapability; (6) assaults on natives; (7) insubordination.

TOPICS OF THE WEEK.

THE COAL INDUSTRY AND THE RAILWAYS.

Every emphasis and the fullest publicity must be given to the case for more railway facilities for the coal mines, made out by Mr. Dawe, the President of the Chamber of Mines, at the Witbank Colliery annual meeting last week. Speaking from the chair at the meeting, Mr. Dawe showed that since the close of the financial year operations had been seriously affected by inadequate railway arrangements. So much had been said in the past in connection with this question of the insufficient railway facilities that one might have expected that a solution of the difficulty would have been found long ago. The following facts show what an important bearing this question had on the work of the company, and it had to be borne in mind that all the collieries in the Witbank district suffered proportionately in the same manner. The time lost by the Witbank Colliery in the twelve months to December, 1915, represented an output of 140,180 tons, and from September, 1915, to December, 1915, 50,070 tons. The estimated tonnage lost by the collieries in the Witbank district for the past three years through shortage of trucks was:—1913, 298,986 tons; 1914, 419,001 tons; and 1915, 502,401 tons. In arriving at these figures the tonnage taken was that for which the collieries concerned had orders on hand. Mr. Dawe appreciated the difficulties by which the authorities were beset at the times of the Rebellion and the South-West Protectorate campaign. It was possible that the reply to the recent deputation might lead the general public to the conclusion that the difficulty was solved. Personally, he was entirely sceptical. It was easy to imagine the effect of references in the Press to this important question. The Railway Administration no doubt considered that it was extremely inconvenient that the question should have been brought before public notice at the present time, seeing that Parliament would reassemble in a few weeks, and that one of the most important matters to be dealt with would be the Railway Estimates. It was impossible for the Railway Administration to contradict the facts submitted by the collieries, therefore the only course was to express sympathy, to promise that a more satisfactory state of affairs would be inaugurated, and to make efforts to supply the collieries' requirements until the Railway Estimates were finally disposed; after that the old state of affairs would, in all probability, obtain again. Mr. Dawe quoted the assurance given by the Minister, and repeated at the meeting held in January, 1914, that the shortage would receive immediate attention. Mr. Dawe then anticipated there would be no cause of complaint. In point of fact, since the discussion then with the Railway Administration there had been a sufficient supply of trucks. But at the meeting a year later, he was obliged to declare: "Unfortunately that state of affairs did not continue for any length of time, and during the past year the company has suffered as much, if not more, from shortage of trucks than it has since this question was first brought under discussion, which was some 10 or 12 years ago." He had every reason for accepting the recent assurances of the Minister with scepticism. It appeared that as long as a complacent House, when discussing Railway Estimates, was satisfied with plausible explanations, instead of assuring itself of the actual facts of the case, there would be no solution of this important question. In his opinion, the only sound way of arriving at a definite and clear opinion on the shortage of rolling stock would be for the House to appoint a Commission or a Select Committee, which would make a searching inquiry. The colliery companies have continually stated the amount of their estimated losses through shortage of trucks, and if the members of the House took the trouble to obtain an estimate of the loss of revenue to the Railway Administration through the same cause during the last 10 or 12 years, the result would somewhat surprise them; they would probably find that the revenue thus thrown away would have been more than sufficient to supply all the rolling stock necessary, and leave a handsome profit. The Transvaal collieries have incurred heavy expenditure in sending their agents to Egypt and India, with a view to opening up trade with the East. The prospects were most promising, and unfortunately the great handicap in the development of this trade was that provided by the Railway Administration of the Union, in spite of the fact that the Minister had stated that the Government was so anxious to assist the development of the coal mining industry. We will not attempt to add anything to Mr. Dawe's eloquent plea, beyond the fact he was merely voicing, in very moderate language, the feelings of the Transvaal coal mining industry.

THE PROGRESS OF MINING IN RHODESIA.

The adjusted returns of the Rhodesian mineral output for the two years 1914 and 1915 read as follows:—

	1914.	1915.
Gold	£3,580,209	£3,823,168
Silver	14,277	17,146
Copper	50,559	224,314
Lead	2,488	557
Chrome Iron	107,612	175,792
Asbestos	8,612	32,190
Coal	115,099	123,194
Arsenic	160	—
Diamonds	3,985	1,016
Ironstone (nominal)	—	1,699
	£3,883,001	£4,399,076

The foregoing returns are approximate, it having been pointed out that the value of the copper has been estimated for declaration purposes at £50 per ton, whereas it has been realising as much as £75 per ton. The same may apply to the asbestos yield, which is estimated at £16 per ton. In the gold value, too, there may be some minor adjustments to be made when realisation takes place. In practically every department of mining all-round progress has been recorded. Of the net increase in the total production amounting to £516,075, £242,959 is due to gold, £173,715 to copper, and £68,180 to chrome iron ore. The last has benefitted in price owing to the demand created by the war, having averaged close on £3 per ton. A further notable increase is shown in the asbestos return ,which exceeded in the year under review the whole of the previous production. Coal hauled shows a figure of 50,000 tons higher than the previous year, probably owing to the increased manufacture of coke at the Wankie Colliery for export to the Congo. A new item appears on the list in the form of ironstone, which has merely a nominal value, being extracted for fluxing purposes at the Falcon mine. The grand total value of the gold and other mineral production to the end of 1915 amounted to £35,269,110, of which the following are the principal items:

Gold	£32,685,342
Silver	220,193
Copper	297,931
Chrome Iron	922,869
Coal	919,941
Asbestos	59,018
Lead	94,787

Throughout the year the supply of native labour has been abundant, the successive monthly returns issued by the Rhodesian Chamber of Mines showing that the advance in the number employed as compared with the year 1914 was between four and five thousand a month. Generous distributions of dividends by the Globe and Phoenix, Shamva, Wankie, Gaika, Rezende, and many other mines were made during the year. When the final list of dividends can be compiled it will be found, we think, to be considerably in advance of that for 1914. The profits shown would undoubtedly have been larger had not the advanced price of stores and mining material of all sorts led in many cases to increased working costs. In such times as these when capital is scarce, it is not surprising that there is no great development activity. This is reflected in figures quoted by the *Bulawayo Chronicle*, which show that out of a total native labour force of approximately 40,000 only about 2,500 are employed on non-producing mines. Under ordinary circumstances no doubt this figure would increase to six or eight thousand, but new work has been restricted as much as possible owing to increased costs and shortage of capital. There is, however, a growing feeling in Rhodesia that the lack of prospecting is lamentable, and bodes ill for the future. Indeed, the only bad feature of mining in the territory is that so little is heard of it.

Metals in 1915.

From the table given below it is possible to compare the highest and lowest prices for metals touched in 1913, 1914 and 1915, and it will be seen that there has been an enormous advance in nearly every case from the best figures recorded during 1914. Current rates are in a few instances, notably antimony and spelter, below those reached during the middle of last year; in other cases there is not much change, while in others fresh records seem to be on the way to being established:—

	1915.		1914.		1913.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
Copper: Strd, cash	87/10/0	57/2/6	66/10/0	49/0/0	77/2/6	61/15/0
Tin: Standard, cash	194/0/0	148/5/0	188/5/0	12/0/0	232/0/0	166/10/0
Lead: Soft, foreign, prompt	30/5/0	18/6/3	24/0/0	17/10/0	21/10/0	15/17/6
Spelter: Prompt	115/0/0	28/0/0	40/0/0	21/5/0	26/10/0	20/5/0
Antimony: English	135/0/0	55/0/0	65/5/0	28/0/0	40/0/0	29/0/0
Silver bars: Spot	$27\frac{1}{4}$d.	$22\frac{5}{16}$d	$29\frac{3}{8}$d.	$25\frac{15}{16}$d.	$29\frac{11}{16}$d.	$25\frac{3}{16}$d
Quicksilver	18/5/0	11/15/0	11/5/0	6/10/0	7/10/0	7/0/0
Pig Iron: No. 3 Cleveland ...	3/18/3	2/14/6	2/14/4	2/8/3	3/18/6	2/8/6

The main influence affecting metal prices was, of course, the War and the munitions demands resulting therefrom.

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Workmen Mine Inspectors.

The West Australian Minister of Mines, the Hon. P. Collier, recently introduced in the Legislative Assembly a Mines Regulations Act Amending Bill, which provided for the appointment in addition to the existing staff of mining inspectors, of workmen's inspectors, to be elected by the mining unions and paid partly by the unions and partly by the Government. The Minister said generally that he believed that the existing provisions for mines inspection were utterly inadequate and that his proposal for the appointment of workmen's inspectors would provide for a closer, keener and more efficient system, while not increasing working costs one iota, and would also make the conditions of work underground more bearable and minimise the risk of accident. The clause in the new Bill relating to the classification of inspectors reads as follows:—

> Inspectors of mines shall be of three classes, namely (a) district inspectors, who shall have full powers of inspectors under the Act; but every district inspector, prior to being appointed shall satisfy the Minister that he has had not less than five years practical experience in general underground mining work, and that he has passed an examination prescribed or approved by the Minister in accordance with the regulations; (b) special inspectors who shall be appointed to make such special inspections, inquiries and investigations on matters within the scope of this Act requiring special technical or scientific training or knowledge as the Minister may from time to time direct; and (c) workmen's inspectors who shall be elected by duly registered unions of mine workers in accordance with the regulations and subject to the approval of the Minister, but no person shall be eligible for such appointment unless he has been engaged in general practical underground mining work as a working miner for at least five years."

The present proposal was passed by the Assembly, and in the Council, after a fairly long debate, the second reading was carried on the voices. Objectionable as the appointment of workmen inspectors is in principle, and is likely to prove in practice, the members of the Council were swayed by the fact that such inspectors have for a long time past existed in the coal mining industry, both in England and Scotland and in Australia.

RAND MINING FIGURES FOR 1915.

Statistical Presentation of Progress— Distribution of Recovery over Costs and Dividends—Importance of a Small Group of Mines.

From the returns of the Chamber of Mines for December we learn that 28,314,359 tons were milled during the year 1915, and that from this quantity of ore gold to the value of £37,264,992 sterling was recovered, being at the rate of 26s. 3d. per ton milled; the working cost averaging 17s. 5d., and the working profit 8s. 6d. per ton milled. Dividends amounting to £7,519,416 were paid at the rate of 5s. 4d. per ton milled. The accompanying statistical table, which covers the period which has elapsed since the Anglo-Boer War, gives a comparative summary of Rand mining results. It has been taken from Dr. W. A. Caldecott's paper on "The Development of Gold Extraction Methods on the Witwatersrand," which was read last year before the South African Association for the Advancement of Science. From the figures there presented, as brought up to date by the returns mentioned, it will be seen in the matter of ore crushed and gold recovered the operations for the year under review have been more successful than in any previous year. The gold won, however, having been obtained from a much larger tonnage has resulted in a smaller yield per ton than before, while the working profit, in spite of a further improvement in the cost of mining and treatment as compared with earlier figures generally, has been lower than at any previous time. Dividends show a corresponding reduction on the tonnage milled. The amount of coloured labour employed, it will be observed, has been the highest on record, and by comparison, the total white labour on the quantity of ore treated has been less. The figure relating to the percentage of the world's annual gold output contributed by the Rand is only a tentative one, the estimate being considered merely a rough approximation by those who have been investigating the question in Europe. Later and more detailed returns from foreign countries will, doubtless, modify the ratio given, which, it will be seen, is an unusually high one.

Year.	Tons of ore crushed.	Gold recovered. Ozs. Fine gold.	Gold recovered. Value. £ sterling.	Percentage of world's annual output.	Yield. s. d.	Average per ton 2,000 lbs.). Working cost.* s. d.	Average per ton 2,000 lbs.). Working profit.* s. d.	Dividends (including sundry revenue. Total. £	Dividends (including sundry revenue. Per ton.† s. d.	Average number of workers. White.	Average number of workers. Coloured (Non-European).
1903	6,071,908	2,832,346	12,031.037	17·9	39 8	24 9	14 11	3,334,347	11 0	11,214	58,703
1904	8.022,736	3,638,017	15,453,312	21·6	38 6	24 4	14 2	3,821,847	9 6	13,027	76,557
1905	11,160,422	4,706,433	19,991,658	25·6	35 10	23 6	12 6	4,754,349	8 6	16,227	131,036
1906	13,571,554	5,559.534	23,615,400	28·6	34 6	22 10	12 6	5,565,969	8 2	17,210	136,321
1907	15,523.229	6,220,227	26,421,837	31·1	33 11	20 10	13 3	6,962,420	9 0	16,755	155.214
1908	18,196,589	6,782,538	28,810,393	31·7	31 5	18 0	13 5	8,536,773	9 5	17,593	160,919
1909	20,543,759	7,039,136	29,900,359	32·0	28 11	17 1	11 6	9,310,751	9 ·1	20,625	168,311
1910	21,432,541	7,228,311	30,703,912	32·8	28 6	17 7	10 6	8,887,185	8 4	23,652	183,592
1911	23,888,258	7,896,802	33,543,479	35·4	27 11	18 0	9 7	7,763,086	6 6	24,708	189,912
1912	25,486,361	8,753,568	37,182,795	38·8	29 0	18 8	10 0	7;960,394	6 3	23,817	192.575
1913	25,628,432	8,430,998	35,812,605	38·3	27 9	17 11	9 6	8,205,199	6 5	23,104	184,266
1914	25,701,954	8,033,570	34,124,434	36·8	26 6	17 1	9 0	8,073,436	6 3	20,971	167,502
1915	28,314,539	8,772,919	37,264,992	46·0*	26 3	17 5	8 5	7,519,416	5 4	21,740	192,962

*Gold held in reserve, expenditure charged to capital account, interest on and redemption of debentures, and profits tax have not been taken into account in the working costs and profits. For various reasons the working profit shown is not in all cases the exact difference between the yield as shown and the working costs as shown. Thus, while the gold recovered from accumulated slimes is included in the yield, the profit therefrom sometimes appears in sundry revenue instead of in working profit. Again, while the yield is valued at a fixed rate per fine ounce, the rate applicable to the working profit is the actual realisable value of gold, which fluctuates slightly.

†The difference between working profit per ton and dividends per ton is accounted for by the fact that the working profit figure is the gross profit obtained, from which is deducted profits tax, amounts appropriated for capital expenditure, contributions to Miners' Phthisis Compensation Fund, debenture interest and redemption, etc., etc., while certain amounts are always carried forward by the mining companies from one financial year to another.

*An approximate estimate from the available data to hand.

A circumstance which will doubtless strike the observer at the outset is the great variation in the published yield per ton milled between the years 1903 and 1915. It would be erroneous, however, to suppose that the figures quoted are a reliable indication of the extent to which the value of the ore mined has altered in depth, and it is in disregarding this fact that those who draw conclusions about the diminution in value of Rand ore as mining depth increases are liable to make miscalculations. If one makes allowance for the gradually diminishing percentage of waste sorted, it will be found, on the assumption that the waste is worth practically nothing, that the original value of the ore during the period under observation has ranged from about 28s. 7d. to 23s. 9d. per ton mined. During recent years the percentage of extraction, owing to more efficient methods, increased by several per cent., so that the estimate of 23s. 9d. is slightly too high. Roughly, however, the limits given may be taken as correct under the conditions specified, and the falling off in value is obviously materially less than is suggested by the recovery returns alone. As an explanation of the lowering of the value of the ore mined some allowance must be made for the increasing number of machine drills in use, and the consequent widening of stope faces, but since this factor has not been greatly augmented during the past four years, it seems clear that the lower ore values are not altogether, or even largely, due to purely economic processes, but to natural changes, over which the industry has no control.

Ratio of Dividends to Recovery.

An interesting feature of the operations of the past few years is the lessening ratio of dividends to recovery, as shown in the accompanying table, which covers the results of the last decade only:—

Table showing percentage on recovery value:

	Dividends.	Working costs.	Balance.
1906	23·57	64·25	12·18
1907	26·35	61·42	12·23
1907	29·63	57·29	13·18
1909	31·14	59·08	9·78
1910	28·94	61·70	9·36
1911	23·14	64.48	12·38
1912	21·41	64·37	14·22
1913	22·91	64·56	12·53
1914	23·65	64·30	12·05
1915	20·18	66·35	13·47

This table shows, that while working costs have been diminishing, when considered on the basis of the tons milled, they have, in the aggregate been growing higher at the expense of dividends, but not to the disadvantage of the large balance of total receipts which is appropriated for other purposes under the head of capital expenditure, reserve, and, of course, profits tax.

INDIVIDUAL RESULTS.

An examination of the Chamber of Mines returns makes it evident that much is due to the performance of a few individual companies. Take, for instance, the records of the following mines for the last two years, as shown in the figures for the months of December, 1913 and 1915 respectively:—

	Tonnage Milled.		Gold Recovered.	
	Dec., 1913.	Dec., 1915.	Dec. 1913.	Dec., 1915.
New Modder	38,650	52,500	£77,555	£117,547
Modder B	31,000	45,000	57,026	102,557
Van Ryn Deep ...	37,050	43,850	62,017	81,221
Modder Deep	—	34,800	—	63,355
Government Areas	—	49,700	—	66,779
City Deep	37,800	61,000	73,664	124,068
Robinson Deep ...	49,000	54,300	74,042	81,616
	193,500	341,150	£344,304	£637,143

These seven companies together, according to the December, 1915, return, are responsible for 14·15 per cent. of the total Rand crushing, and produce no less than 19·86 per cent. of the total gold recovered, out of a total of 53 companies on the Chamber of Mines list. They have been increasing their capacity during the last two years, and in the case of two of them, have only begun operations within that period. Five of them are situated in the Far East Rand. It is obvious that without the assistance rendered to the industry by this small group of mines the showing of the year 1915, as it appears in the table at the head of this article, would be materially diminished. In other ways, also, it may be demonstrated how much is due to a comparatively small number of important concerns. For example, some 16 mines, *i.e.*, 30 per cent. of the whole number that appear in the December records, crush 33·4 per cent. of the tonnage, and pay 57·66 per cent. of the dividends. It is worth remarking that all these concerns have recovery values above the average of 26s. 5d. recorded for December last. The remaining 37 companies, declaring 42·34 per cent. of the total dividend disbursements have values lower than the average. While the recovery values of the lower group of mines range from 14s. to 26s., those of the upper group run from 26s. to 46s., and are, generally speaking, exceptionally high. From what has been said, therefore, it will be apparent how much of the prosperity of the Rand depends upon a comparatively small section of it.

MANICALAND GOLD PRODUCTION IN 1915.

Name of Claims and Present Owner.	GOLD PRODUCED.		VALUE.		
	Fine Gold. Ozs.	Fine Silver. Ozs.	Fine Gold. £ s. d.	Fine Silver. £ s. d.	Total. £ s. d.
REEF BATTERIES:					
Braganca.—Andrada Mines, Ltd. (A. Burt, until Aug., tributor) ...	2,509.84	1,159.33	10,404 3 7	115 17 10	10,520 1 5
Central.—Manuel de Lacerda (A. Oertel, tributor)	108.87	31.03	451 3 1	2 13 10	453 16 11
Chimezi-Rhodes-Banket.—Antonio Gaspar D. Pereira	48.45	21.07	200 14 2	1 6 0	202 0 2
Great Gold Pot.—Zambuzi Syndicate	70.73	25.68	293 2 6	2 4 10	295 7 4
Firenza.—Chesterford Gold Mining Syndicate	92.95	16.68	385 4 9	1 8 10	386 13 7
South Firenza.—Chesterford Gold Mining Syndicate	67.45	12.57	279 9 6	1 1 10	280 11 4
Persimmon.—Louis FitzGerald (Persimon Syndicate, tributor)	238.81	32.76	989 19 5	2 17 2	992 16 7
Piemonte.—Eusebio Gualla	9.77	1.19	40 8 6	0 2 0	40 10 6
Saxonia.—Arthur Oertel	42.36	12.89	175 10 4	1 2 4	176 12 8
Wednesday.—Wednesday Syndicate	101.81	20.06	421 19 1	1 15 0	423 14 9
TOTAL	3,291.04	1,333.26	13,641 15 7	130 9 8	13,772 5 3
CYANIDE:					
Braganca.—Andrada Mines, Limited	226.44	236.36	938 12 7	23 12 6	962 5 1
CONCENTRATES:					
Braganca.—Andrada Mines, Limited	82.00	305.00	348 10 4	31 16 1	380 6 5
TOTAL REEF PRODUCTION	3,599.48	1,874.62	14,928 18 6	185 18 3	15,114 16 9
ALLUVIAL:					
Manica Alluvial.—Andrada Mines, Limited	9,322.78	771.90	38,642 10 11	77 2 7	38,719 13 6
GRAND TOTAL	12,922.26	2,646.52	53,571 9 5	263 0 10	53,834 10 3

New Kleinfontein.

The report of the directors of the New Kleinfontein for the quarter ended 31st December, 1915, shows that the total working costs amounted to £139,624 4s. 8d., equal to 17s. 3·942d. per ton milled; net working profit, £67,934 10s. 7d., equal to 8s. 5·174d. per ton milled; revenue, £207,558 15s. 3d., equal to 25s. 9·116d. per ton milled. No allowance has been made in the above for pumping and maintenance of the Apex section, £3,958 7s.; interest, £2,646 11s. 6d.; Government profits tax and special war tax, nor for provision of £4,400 which has been made to meet the increased realization charges on gold for the year 1915. Shaft sinking: Number of feet sunk: Eastern section (No. 1 east subsidiary shaft), 172 feet; western section (No. 7 Apex incline), 269 feet. Development: Number of feet driven, risen and sunk (excluding shafts), 5,341 feet eastern and central, 2,473 feet western; footage sampled, 3,005 feet eastern and central, 527 feet western; average mining width, 58 inches eastern and central, 120 inches western; average assay value (mining basis), 4·76 dwts. eastern and central, 4·15 dwts. western; estimated tonnage of ore exposed by drives, etc. (mining basis), 146,028 tons. Of the total development footage in the western section (Apex) of 2,473 feet, 1,133 feet were on reef; of the 527 feet sampled, 407 feet were in payable ground. The drives are not valued until after full exposures of the reef by boxholing. Ore treatment: Tonnage mined, including ore obtained from development faces, 193,473 tons; less sorted out (16·65 per cent.), 32,220 tons; tons to mill, 161,253 tons; deduct added to ore in bins, 103 tons; ore milled, 161,150 tons. Capital expenditure: Apex-Benoni section: Development, £14,001 0s. 7d.; equipment, £20,118 4s.; total, £34,119 4s. 7d. New Kleinfontein section: Shaft sinking, £2,344 14s. 8d. Subject to the annual re-estimation, the ore reserves at the end of the quarter on a mining basis were as follows: Payable, 2,846,712 tons; mining width, 57·35 inches; value, 5·48 dwts.; unpayable, 1,289,734 tons; mining width, 51·95 inches; value, 2·76 dwts.

Manicaland Output.

The mineral output of the territory of the Companhia de Moçambique (Manicaland), for the month of December, 1915, was as follows:—Reef: Mill—Gold won (fine), 67ozs. 6dwts. 4grs.; tons crushed, 292; value, £278 17s. 6d. Alluvial—Gold won (fine), 670ozs. 10dwts. 10grs.; cubic metres dredged, 62,400; value, £2,779 10s. 10d.

POSITION OF THE CAPE-CAIRO OIL COMPANY.

The following circular, dated December 20, in anticipation of the annual meeting fixed for the 28th, was issued by the secretary to shareholders in the Cape-Cairo Oil Development Company, Ltd., from 16, Regent Street, London, W. As there are many shareholders among our readers in this country, we print it in full:—

The annual meeting of the shareholders of the above company will be held at the above address on Tuesday, the 28th inst., at 11.30 a.m. The outbreak of war, together with the financial crisis and the restrictions relative to the registration of new companies, effectually stopped the excellent headway which was being made, more especially in connection with the projected subsidiary company for the operation of the Natal shale areas. Development work upon your properties ceased shortly after the outbreak of hostilities, but all rentals have been paid to date, and your titles are in full force and effect. The molybdenum deposit, which was discovered to exist upon your areas, has been disposed of to "Molybdenum, Limited"—a company formed for the purpose of acquiring and handling the deposit. This company has, in addition, acquired several adjoining areas, and 25 per cent. of the entire nominal capital has been assigned to the Cape-Cairo Company. The Del Monte process has made rapid strides, and is now acknowledged in scientific and engineering circles to have fully justified on a commercial and practical basis the many claims for the process. A large installation will shortly be in operation at one of the leading Leicestershire collieries. Prolonged negotiations between Oil and Carbons, Ltd.—as owners of the British rights of the process—and the Del Monte Trust, as owners of the world's rights—and your directors have culminated in the acquisition by Cape-Cairo Company of the sole and exclusive rights of the process in the English counties of Lancashire and Yorkshire, together with the whole of Great Britain, for peat and turf, and, in addition, the full rights to the whole of Africa, Belgium, Russia, France, Italy, and Roumania. In view of the fact that most of the oil, coal treatment, and briquetting plants in Belgium and France have been totally wrecked, the rights thereto are likely to prove of very great value so soon as re-building can be embarked upon. Part of the South African territory has been surrendered, but in such a manner as to reserve to the Cape-Cairo Company the right to operate the process upon the several areas under its control. These areas, it will be remembered, were acquired on the recommendation of Mr. Cunningham Craig, subsequent to his official inspection on behalf of the Union Government, and comprise the most valuable of their kind inspected by him. The acquisition of these new rights, together with the heavy expenditure incurred previous to the outbreak of war, legal and other charges, has resulted in the creation of a debit balance of £1,500, which sum has been advanced, by way of loan, to the company by the directors. The issued capital of the company is £45,000, leaving 5,000 shares still unissued. Pending the Declaration of Peace, current expenses have practically ceased, and in view of the extremely valuable and extensive assets and rights now held by your company, the directors feel justified in congratulating the shareholders upon the highly satisfactory state of affairs, despite the fact that the company is not, at the moment, in a position to pay any dividend upon the invested capital. Your board has, during the past year, been strengthened by the addition thereto of Mr. J. W. Shawyer, vice-chairman of the Del Monte Trust, Ltd., whilst Mr. J. A. Campbell, who has acted as secretary since the inception of the company, has also accepted a seat on the board."

GOLD MARKET IN 1915.

Germany's Hopeless Position as to Gold— Authoritative Review of the World's Output.

Messrs. Samuel Montagu and Co., in the course of their annual bullion letter, say:—

The year 1915 will be for ever memorable. The Great War has stirred all departments of life, financial and commercial, to their very depths. It is fortunate for Great Britain and her Allies that resources so varied and so vast are at their command in this time of stress. Notwithstanding the gravity of the present war, the holder of a Bank of England note can always obtain gold on presentation. This forms a striking contrast to the practice of other countries with regard to their issues of bank notes. The practical gold point has moved considerably, owing to the increased cost of freight, and more particularly that of insurance. At one time a gold shipment to the United States of America cost anything up to nine times as much for freight and insurance as it did in the time of peace. Previously it was a matter of course that nations of the first financial standing claiming a gold standard should remit gold whenever exchange moved much below the gold point. But the more the military forces of these countries became mobilised the more their gold became immobilised. The greater the demand for imports or the reduction in exports the more difficult it became to secure the gold necessary to adjust the adverse balance of trade. In view of the improved output from the Transvaal and other African districts the world's production for 1915 is likely to be in the neighbourhood of £98,000,000.

The following figures, which exclude the amounts held privately and otherwise by banks in the United Kingdom and Ireland, convey some idea of the sound position of the Empire with regard to gold: Bank of England, against notes (December 29), £51,338,430; Treasury Note reserve, £28,500,000; Commonwealth Bank, against notes (June 30), £11,034,705; New Zealand banks, cash and reserve against notes, say, £6,000,000; Canadian central note reserve (October 31), £2,350,000; National Bank of Egypt, against notes, £7,121,799; Indian gold standard reserve (November 30), £5,158,142; Indian note reserves (December 22), £11,780,000; Straits Settlements note guarantee fund, £797,685; total, £124,080,761. In addition to this sum there is the very large amount held by English, Scotch and Irish banks, as well as the substantial sum still retained in the possession of the public. Further, about two-thirds of the world's gold supplies are derived annually from the British Empire. About £60,000,000 is thus added automatically to the gold resources of the Empire. The output of the enemy Powers for 1912 was as follows: Germany, £1,070,000; Austria-Hungary, £410,000; Turkey, £400. The amount of paper currency already issued by these Powers during the war approaches probably 500 times this sum.

The following figures bring forcibly to the mind the immense power possessed by Indian labour to draw a tribute from the outside world. In the ten years 1905/14 alone the net import of the precious metals into India amounted to: Gold, £133,000,000; silver, £31,000,000; total, £184,000,000. The total Indian public debt registered in London amounts only to £95,000,000.

Swaziland Tin.

The following are the particulars of the Swaziland Tin Company's output for December:—Concentrates recovered, 34,497 long tons; estimated profit (taking the price of tin at £160 per ton), £1,070; to which must be added (being adjustments in respect of previous shipments), total £1,804.

New City Loan.

A new loan issue of Capetown Municipality is announced. The terms offered are a 5 per cent. loan for 42 years, subject to repayment at the Council's option after seven years at a premium of £3 per centum. The whole or any portion (but not less than 5 per cent.) can be paid on application, the balance can be paid when convenient to the lender, up to the end of next year. In order to meet the small investor applications will be received in sums of £10 and multiples thereof, and with the right to pay the greater portion of the money over a long period an exceptional means of saving is provided for the local public. The Council must raise this loan locally if the drainage works are to be executed, since the British Treasury will not allow Colonial municipalities to raise loans in London while the war is in progress, and consequently Capetown has to depend entirely upon local resources. The loan will be allotted immediately application is made in order of applications and at a fixed price, so that the small lender is placed in as good a position as the capitalist who has large sums to invest.

RAND METALLURGICAL PRACTICE.—III.

Discussion of the Paper of F. L. Bosqui, presented at the San Francisco Meeting of the Chemical and Metallurgical Society, September, 1915,

The following is the continuation of Dr. Caldecott's contribution on Mr. Bosqui's paper:—

On the other hand, the simple classification system shown in C, whereby tube-mill and safety cones only are required and a minimum cost of pulp elevation is involved, permits of irregular or fluctuating distribution of pulp to the former to be corrected by safety cones of ample size receiving the total overflow of the tube-mill cones from a common launder. In emphasizing the utility of Schmitt tube-mill feeders, the author expresses the common opinion of users but does not refer to the advantages of pebble bins with automatic pebble feeders actuated by the tube mill. He likewise confirms the advantages of the scoop discharge for tube mills as recently described in detail by W. R. Dowling and refers to the desirable location of tube mills below stamps as illustrated by the same metallurgist over four years ago in the form shown in Diagram C. As the scheme for a proposed new reduction works illustrated in Fig 7 is not in actual operation, comment thereon can only be based on past experience of the various devices shown and on their relation to each other; it is to be regretted that the author had not the opportunity of demonstrating by actual results the advantages or otherwise of his proposed plant as compared with existing practice. The undesirability of a double row of heavy stamps and the excessive volume of pulp to be amalgamated and re-elevated has already been referred to, as well as the absence of safety cones following the return cones. The elevated position of these last further involves much coarse pulp being raised to them merely to gravitate down to the tube-mill cones, instead of being elevated only to the height of the latter, according to the method shown in Fig. C. The Dorr thickener shown, while a useful device when crushing with cyanide solution for removing surplus solution from slime pulp prior to air-lift agitation or vacuum filtration, is not adapted to effect as complete a separation of water from settled slime as the ordinary intermittent settlement and decantation. The author's assumption that the latter yields a settled slime containing 50 per cent. of moisture with banket ore slime, which is a very good result for a continuous thickener, is apparently based on data from obsolete and inadequate plants, since in a modern slime plant 40 per cent. of moisture in settled slime is by no means the highest degree of settlement obtained under ordinary working conditions. This difference of moisture content is of great importance, because with a 50 per cent. settlement half as much water again is added to the working solution as with a 40 per cent. settlement, and in consequence the same additional amount of dilute working solution has to be regularly discharged with its gold, cyanide, and lime contents. As regards the vacuum filter, the author places the extraction by this process at 93 per cent. This is appreciably higher than by decantation, but is obtained at an extra cost of 2½d. to 4d. per ton. Comparing this with the Robinson Deep figures quoted by the writer earlier, which show an extraction by decantation slime treatment of practically 90 per cent., it will be seen that the difference of 3 per cent., equal to 2·7d. on 1·802 dwt. slime, is slightly less than the average extra cost of filtration. Hence the author's dictum that vacuum filtration should be adopted in all new plants may be received with some qualification, and as being specially applicable to rich slime where a small additional percentage recovery on the value is profitable. The inference that thorough separation of sand and slime by classification is due to the influence of vacuum filtration is hardly warranted by present or recent practice, since the achievement of such separation has been in vogue prior to 1910, on plants where decantation practice obtained and is still practised. In fact, at the present time the most advanced practice is to confine the product separated as slime to colloid particles so far as possible, since fine granular particles of silica or pyrite yield a very good extraction when included in the sand charges without interfering with leaching, whereas their presence in slime charges delays dissolution of its gold contents, raises the value of slime solution, and increases wear on slime sludge pumps. Fig. 7 does not indicate the disposal of the water drainage from the sand vat when filled, but the proposed treatment in this vat of the sand collected from a water-borne pulp is a revival with cleaner sand of Rand practice of 15 or 20 years ago. As the author states, it was formerly customary to apply weak cyanide solution in the sand collectors, but he omits to give the reason for the abandonment of this practice, which was the contamination of the mill service water with cyanide and consequent dissolving and loss of gold contained in the ore crushed. The seriousness of this loss may be gauged not only from the above fact, but from published references of which possibly the most notable are the following, *Transactions of the Institution of Mining and Metallurgy*, vol. xiii., pp. 77 to 84, Nov. 19, 1903, by Charles Butters and Hennen Jennings. Charles Butters said: "No cyanide solution is ever run into the collecting tank (*i.e.*, when equipped with a Blaisdell excavator) as its contents, after having been filled from the battery, are allowed to drain, and are then transferred by means of the excavator direct to the leaching tank. Therefore no loss of gold can take place from cyanide solution having been introduced into the collecting tank, as is the case when the collecting tank is filled directly from the battery, and gets its preliminary treatment of cyanide solution in the same tank. I have yet failed to find a reservoir on the Rand that did not have gold in solution from this cause. This gold in the reservoir varies in value with the season—being higher at the end of a dry season than at the commencement of it, because during the dry season the reservoirs never overflow, but become concentrated from evaporation in the warm atmosphere. At Virginia City we found as much as 50 per cent. of gold dissolved out of the charge, by filling into a collecting tank in which the charge before had received a preliminary cyanide treatment, and, strange to say, this loss continued for over two weeks after we had discontinued the use of cyanide in the filling of the vat, and this, notwithstanding that we had washed it out as clean as we could. While we could obtain no trace of cyanide at any time, still the loss went on, until after two very anxious weeks it gradually stopped. This occurred on two different occasions. At first I attributed it to an excessive amount of ferric salts in solution, acting possibly as a solvent for gold; but we found out later that it was from the traces of cyanide that could not possibly be detected by any chemical test. Mr. Hennen Jennings and myself had both made a series of determinations at Johannesburg as to the gold in the battery water from this source, and with similar results—gold was invariably found. It is not easy to state the exact loss from this source, but that it is a source of loss which should be eliminated I think all engineers and metallurgists will agree." Hennen Jennings said: "The remark of Mr. Butters as to gold being found in the battery water was correct. He regretted that he had no detailed figures with him. Some very extensive tests had been made at mines with which he had been connected, and it had been found that even in large storage reservoirs the water held a slight amount of gold in solution. It varied from a trace up to sometimes as high as 1 dwt., but that was very exceptional."

(To be continued.)

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Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

Mine Regulation Anomalies.

To the Editor, *South African Mining Journal.*

Sir,—Will you kindly give me some light on the following points:—

Regulation 100, section 9 (b) reads as follows: "In any mine other than a fiery mine no person shall drill or cause to be drilled any hole in any drive, cross-cut, winze or raise, or on any bench in a stope where a misfired hole is known to exist, until such misfired hole has been again blasted." This clearly states that no hole may be drilled near a misfire.

Now, regulation 106, section 14 reads as follows: "A ganger or a miner who is the holder of a blasting certificate shall cause every drill hole to be bored not nearer to a socket of a hole, or a misfire than 12 inches, and to be given such a direction that it cannot come nearer to such socket or misfire, or the line of direction thereof than 12 inches." This section flatly contradicts Regulation 100, section 9 (b), by permitting a hole to be drilled within 12 inches of a misfire. This section also makes development impossible by stipulating that no hole may be drilled within 12 inches of a socket, or the direction of a socket. In the case of machine development the back holes and lifters must always be within 6 inches of a socket, and, in fact, all the holes must be within 12 inches of a socket. I should like you also to give a definition of the term "socket."—I am, etc.,

H. C. F. B.

[These are, of course, by no means all the apparent anomalies in the Mines Regulations. We shall endeavour to obtain the ruling of the Mines Department on the points raised by our correspondent.—Ed. *S.A.M.J.*]

The Diamond Fusion.

To the Editor, *South African Mining Journal.*

Sir,—Apropos of your remarks on a coming fusion of diamond mines, may I recall what Colonel Harris said regarding the effect of the last crisis in the market. "Dealers could not buy," he explained, "in fact would not look at a rough diamond, owing to the sudden failure of the American demand. What this meant to the trade will be apparent when I remind you that for a long period America had absorbed about two-thirds of the total production of South Africa. The crash came unexpectedly, when everybody in the business was full up with supplies. The Syndicate in London, and the manufacturers and dealers in Amsterdam, Antwerp and America held enormous stocks of rough and polished, while in addition there were large commitments for future deliveries, and serious obligations for bills discounted. The crisis was so wholly unforeseen, and took everyone concerned so completely by surprise, that no provision could have been made for even decreased sales, let alone the total cessation of business which actually ensued. Consequently a very large number of Continental merchants and manufacturers found themselves in a very tight corner, and appealed to the Syndicate and large producers to give them breathing time in which to extricate themselves from their difficult position." How and by whose efforts the storm was weathered we then heard for the first time, and from Colonel Harris. He explained how the De Beers and Jagersfontein Companies, together with the Syndicate and Continental bankers, did their utmost to relieve the market by restricting the output, and making the most favourable financial arrangements in their power. With regard, however, to restricting the output, Colonel Harris stated that other large producers did not make the response which had been expected at their hands. "It was," he added, "a case of self-preservation, for had large quantities of diamonds been thrown on the market by all producers alike, not a stone would have been sold, the Continental bankers would in all probability have refused further financial facilities, a panic would have been created, confidence destroyed, and general demoralisation brought about, resulting in the majority of those who distribute diamonds through the world's markets being driven out of the trade. This calamity, I am pleased to say, has been averted by the combined action of those to whom I have referred." These facts speak for themselves.—Yours, etc.,

"INTERESTED."

Karroo Coal Controversy.

To the Editor, *South African Mining Journal.*

Sir,—As I take a great interest in the promotion of all South African industries, I have followed the letters in your valuable journal with interest. It appears to me rather late to ask such questions as those which Mr. Nettleton puts to Mr. Chambers. The latter gentleman has doubtless proved the "carbonaceous" character of the deposit, and the next step should be taken to prove its extent and decide whether the deposit or "issue" is a valuable and economic one. May I ask your kind permission to urge that coal and carbonaceous material may be more useful than to burn it on an open fire. In a short time the Natal Ammonium Company will have their plant at work, and those engineers who have remained deaf and blind to the enormous potential value of our fuel beds will have their ears and eyes opened to the correct method of using coal in such a way as to get waste gas for power purposes as a "bye-product." The Karroo deposit may be more valuable to "treat" than to burn, and I am sure we shall all be glad to see Mr. A. L. Chambers succeed in establishing another industry in the Karroo.—Yours, etc.,

KENNETH AUSTIN, M.Am.I.M.E.

Chemists and War Munitions.

To the Editor, *South African Mining Journal.*

Sir,—I will be obliged if you will publish the enclosed letter from the Ministry of Munitions of War in an early edition of your paper. Thanking you in anticipation,—I am, etc.,

JAS. GRAY,
Hon. Secretary,
South African Association of Analytical Chemists.

Ministry of Munitions of War,
Department of Explosives Supplies,
Storey's Gate, Westminster, S.W.,
31st December, 1915.

Dear Sir,—Referring to previous correspondence, I am directed to write to you on behalf of Mr. Cullen, of this Department, who is at present away ill, to inform you that owing to difficulties which have arisen, it has been decided not to proceed with the scheme of *Training Chemists in South Africa.*—I am, etc.,

(Signed) A. E. TAYLOR,
Staff Bureau.

Jas. Gray, Esq.,
Hon. Secretary,
African Association of Analytical Chemists,

PERSONAL.

Mr. C. F. Wienand, Commercial Exchange Buildings, announces in our advertising columns that he has taken over the sole agency for South Africa Mines Lubricants, Ltd., and all enquiries, orders and remittances are to be addressed to him in future.

* * * *

The list of certificates issued by the Mines Department for the month ended 31st January, 1916, is as follows:—Mine Managers' Certificates (Metalliferous): W. Jones. Mine Overseers' Certificates (Metalliferous), T. Bennallack; (Collieries) G. Virgo.

* * * *

The following dates have been fixed by the South African Red Cross Society for the Mine Ambulance Competitions for the shields presented by the Chemical, Metallurgical and Mining Society, and the Transvaal Coal Owners' Association:—Surface Workers Shields, March 12th; Underground Workers Shield, March 19th; and the Colliery Workers Shield, March 26th. The conditions will be ready during the course of next week and will be posted to each mine.

* * * *

The following officers have been elected by the Geological Society of South Africa for the year 1916:—President, Dr. P. A. Wagner; vice-presidents, Mr. E. P. Mellor, Dr. A. W. Rogers, and Mr. D. Wilkinson; hon. secretary and treasurer, Dr. R. B. Young; auditor, Mr. Stuart; members of the Council for two years, Messrs. E. H. Clifford, A. L. du Toit, J. A. P. Gibb, A. L. Hall, H. S. Harger, G. G. Holmes, E. T. Mellor, H. Meyer, E. J. Renaud, A. W. Rogers, D. Wilkinson, and R. B. Young.

Trade in November.

The October trade returns issued by the Union Department of Customs and Excise enabled us to congratulate ourselves on a recovery which seemed to show that South Africa was recovering rapidly from the detrimental effects of the war on her trade. Both the import and export totals (allowing in the latter case for the absence of official figures referring to the gold export) approached fairly close to those of the years preceding the war; the export figures, excluding gold, were actually higher than in the corresponding month of any previous year except 1913, notwithstanding the immense reduction in the exportation of ostrich feathers. The figures for November appear—the appearance, as will presently be shown, is deceptive—to indicate a serious falling-off. Imports of merchandise for the month amounted to only £2,449,657 as compared with £2,207,017 in November, 1914, and £3,096,314 in November, 1913. Exports of South African produce (exclusive of gold) amounted to £1,320,495, as compared with £962,188 in November, 1914, and £2,247,783 in November, 1913. Imports and Exports were each more than £600,000 below the level of the preceding month. In this connection it must be remembered, however, that in November there was a special dislocation of shipping owing to additional vessels being requisitioned by the Imperial authorities. During the month only three of the ordinary mail steamers arrived in Capetown from England; and only two sailed from Capetown for England. The maintenance of normal trade, inwards and outwards, could not, therefore, be expected.

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Pilgrims Rest Mining Activity.

We understand that the five-stamp battery erected to crush ore at the Georgian mine at Frankfort had a trial run last week, which was eminently satisfactory, and that it is in full swing now, says the *Pilgrims Rest News*. We shall anticipate with interest next month's crushing, as, with plenty of ore at "grass" and with Mr. Cogill in charge of the reduction plant, good results should be obtained. The New Frankfort Syndicate are also starting crushing operations at an early date. Their development is well ahead and they have plenty of ore available to keep the mill going for a long time. Both these companies' activities are in the neighbourhood of the New Lisbon Berlyn's mine, and it seems extraordinary, if not bad luck, that that company should have had good things like these staring them in the face and not have been able to locate them. If these two propositions prove the success that is anticipated, it is likely that other small mines will be opened up in the near future in this disrtict. At any rate, it is quite pleasant to know that there are producing companies in Frankfort again. The tributors of the Blackhills mine have not had the best of luck since they took over the mine on tribute; but at length they have obtained some return for their enterprise. The manager, Mr. Macer, informs us that during the present month they crushed 228 tons, from which they recovered 116 ozs. This is very satisfactory, as it pans out at over 10 dwts. per ton. If that return can be maintained the tributors will get back all they have put in, and make a good and well-deserved profit as well.

Messina (Transvaal) Development.

The September quarterly report states that the mill recovery has been brought up to an average of 86.60, with an average feed to sorting plant of 6.40 per cent. During the last month in the quarter the table tails were reduced to 0.45 copper, as against 2.5 to 3.0 per cent. which prevailed the previous year. A new slimes plant is being installed, and when completed will add to present recovery, say, 3 to 5 per cent., provide means of retreating old slime dumps, and save loss of mill water.

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THE NEW COAL-DUST EXPERIMENTS.—V.

Seventh Report of the Explosions in Mines Committee.—Phthisis and Rand Mine Dust.

[By J. S. Haldane, M.D., F.R.S.]

If it were used wholesale in coal mines it might introduce a danger to health which, even though small as compared with the effects of the more dangerous forms of dust, would cost far more lives or cases of disablement than would be saved by abolishing coal-dust explosions. At present, we do not know how great or how small the danger arising from flue dust inhalation would be in practice, but it does not seem to me justifiable to experiment in this direction on fellow-men. As shale dust and other harmless materials are available for stone-dusting, and there seems to be no doubt as to their safety, there is, in any case, no necessity for using a substance as to the effects of which on men serious doubts exist.

Quality of Shale Dust to Ensure Harmlessness.

It may be of use to endeavour to give some indication of the characters to which shale or other material used for stone-dusting ought probably to conform, in order to ensure its harmlessness when breathed. It ought evidently to be capable of being easily disintegrated into a fine powder, otherwise it would be unsuitable for its purpose in stopping coal-dust explosions or would require very elaborate treatment to make it suitable. Hard stone of any kind is thus unsuitable, apart from any danger arising from its inhalation; but, in any case a hard stone should not be used, as the dust from it would very probably be dangerous to breathe. A soft and easily disintegrated stone containing coarse particles of sand or quartz seems also unsuitable, as the coarse particles might easily be broken up to some extent, in the process of grinding up the material, and might thus yield fine sharp-edged particles which would cause trouble when inhaled. If the stone were very finely ground, this risk would be increased. Some of the rock adjacent to coal seams contains so much sand that, although it is quite soft and easily disintegrated, the sand can readily be recognised by the roughness which it imparts, and the stone itself may be classified as sandstone. When this rock is pounded up, the clay of which it mostly consists can be washed away, leaving the sand, which is easily recognised by its feel, colour, and appearance under the microscope, particularly on rotating the field with crossed Nicols. On similarly attempting to separate sand from a small quantity of such shale as is used at Altofts or Bentley for stone-dusting, no residue of sand is obtained by ordinary rough methods, such particles as are presumably present being too small to separate out. The shale itself is also without roughness on its surface, and it yields quite easily to the teeth. It seems desirable that any shale used for stone-dusting should be as free from grit as that just described. Whether the presence of oily matter in a shale is a serious objection to its use for stone-dusting is still doubtful. Provided that a mixture of shale dust and coal yields 50 per cent. or more of ash it is very probably of indifference whether the shale itself contains some organic matter. Powdered clay or chalk (free from flint or grit) would doubtless be as effective as shale dust in stopping explosions, and both of these substances are known from human experience to be practically harmless as regards inhalation. Dust from hard limestone gave an unfavourable result in Beattie's experiments. Our experience with flue dust indicates that gritty material of the nature of powdered slag, clinker, or flue dust should be avoided. Sand is relatively ineffective for stopping explosions, and is too coarse to become easily suspended in the air. For the same reason, and probably also because the particles are rounded, it cannot be regarded as dangerous from the point of view of inhalation unless the sand particles are broken up by some violent process. For stone-dusting a substance is required which is as easily suspended in the air as coal dust, which is as harmless to breathe, and which passes along with the coal dust to such positions as the tops of timber bars on the roof. That shale dust fulfils all these conditions is shown, I think, in a striking manner by the experience of the Nottingham coalfield and the investigations, made under the late Mr. Fryar's direction, of the fine dust from the floor, sides and roof timbers.

Importance of Dust Prevention.

Although coal dust and shale dust are relatively harmless when breathed, there is good reason for believing that they must do some harm in the long run; and the fact that above the age of 55 there is a somewhat undue rise in the mortality from lung disease (mainly bronchitis) among coal miners is very probably connected with inhalation of dust. Between the ages of 55 and 65 the death-rates per 1,000 from bronchitis are 3.1 among all occupied males, 1.7 among farm labourers, 5.6 among coal miners, and 4.0 among Notts. and Derbyshire coal miners. It seems, therefore, that apart altogether from the risks of coal-dust explosions and the discomfort caused by dusty air, it is desirable on grounds of health to prevent dust as much as practicable. The dust can be diminished in various ways; for instance, by using tubs which will not scatter small coal and dust along the roads, by cleaning up roads when much dust accumulates, and by not putting on more stone dust than is really necessary to make the roads secure from dust explosions. A good admixture of coarse with fine shale dust seems also desirable, as this will tend to keep both coal dust and shale dust down, besides making the application of the shale dust more easy. Occasional watering of the floor, or application of hygroscopic salts, such as calcium or magnesium chloride, will also help. It does not seem desirable to grind up the shale dust too fine, as the probability of grains of silica being thereby broken up would be increased. The facts which indicate that even coal dust or shale dust has, in the long run, some prejudicial effect on the lungs, make it more necessary to be very cautious as to the use for stone-dusting purposes of any material as to the effects of which on the lungs there are good grounds for suspicion.

Summary.

(1) Both from human experience in coal mines and from experiments on animals there is clear evidence that shale dust, when inhaled, is no more deleterious than coal dust, so that shale dust may be used quite safely for stone-dusting in coal mines.

(2) Flue dust, when inhaled, produces in animals effects which point to the conclusion that it may be unwise to employ it for stone-dusting in mines.

(3) Indications are given as to what varieties of stone-dusting material may be used in mines without detriment to health.

(4) It is desirable from the point of view of health to reduce, as far as practicable, the inhalation of any kind of dust in mines.

APPENDIX.

Experiments on the Inhalation of Different Varieties of Dust.

By A. Mavrogordato, M.A., M.R.C.S., L.R.C.P.

This report is an account of a portion of an investigation undertaken for the Medical Research Committee under the National Insurance Act, and deals with an attempt to ascertain whether certain materials can be safely used for stone-dusting. Since, under industrial conditions, miners are exposed to mixed dusts, and neither the clinical history nor the post-mortem examination can settle which dust, if any, was at fault, in these experiments guinea-pigs were exposed in groups to particular dusts, each group to a single variety of dust. The dusts so far used were four in number: Coal, shale, flue dust, and quartz dust from the Transvaal gold-bearing reef. Six guinea-pigs were, in each series, placed in a box and, by means of a fan, a thick cloud of dust was kept in the atmosphere. In each series there were 12 such exposures, each lasting about two hours. The animals were killed by coal gas at intervals varying from an hour to four months after the last exposure. The lungs were removed, fixed and stained for microscopical examination. Films were also made from the cut surfaces of the lungs immediately after death with a view to learning whether there might be any variation in the cytological reaction to the different dusts.

General Results.—None of the guinea-pigs suffered obvious ill-effects as the result of dusting, and out of 40 used only one died in the course of the five months during which the work has been carried on.

Comparative Results.—The experiments fall into two groups: (1) The guinea-pigs exposed to coal and shale; (2) those exposed to Transvaal dust and flue dust. While about the same quantity of dust appeared to find entry in each case, the reaction was much slighter in the animals of Group (1) than in those of Group (2). Not only was there less cell proliferation, but the dust was more readily got rid of. In the case of the shale, the dust disappeared completely after three months, and the lungs appeared normal. In the case of the coal, isolated dust cells were still to be seen after four months, but there were no areas of condensed lung tissue. In both the Transvaal and the flue-dust series the reaction was much more marked and lasting; it was most marked with the latter. Considering the state of the lungs, it was surprising that the animals showed no evident constitutional symptoms. Even in these cases the lungs were clearing up, though in specimens taken from animals killed four months after the last exposure there were still patches of proliferation and condensed lung tissue. Two further series of experiments have been partly carried out; one with flue dust and one with shale dust. The duration was the same as in the previous cases, but the exposures were more severe, the dust cloud being maintained at a greater degree of intensity. The shale-dust animal so far examined presented surprisingly little reaction; for some reason less dust appeared to have gained access to the alveoli than in the previous series, and only very fine particles were to be seen. It may be mentioned that the guinea-pigs used were younger and smaller than those of the earlier experiment. There was but little cell proliferation and the blood vessels were not congested. The corresponding flue-dust guinea-pig repeated the results obtained in the earlier series and presented them to a more intense degree. The flue dust used was from a different colliery to the sample previously employed. There was a curious absence of free dust in the alveoli, although there were large numbers of free dust-laden cells.

Examination of Films.—The cells found on the films were partially lung cells and partially blood cells. The lung cells were of the large and small endothelial type, the former preponderating in the earlier stages, the latter in the latter. It was the large cells that were especially dust-laden. Fragments of dust-laden non-nucleated protoplasm were to be found on the slides, presumably broken off from the large cells. The typical granular cell of the guinea-pig's blood is of the eosinophil type, and these occurred in varying proportions in all the films, but though dust was to be found in them it was not at all common. The endothelial cells from lungs are also granular in some cases, and when stained by Leishman's method both baso-phil and acido-phil granules were to be seen, but not in the same cell. No definite qualitative difference has been so far made out in the cytological reaction with different varieties of dust, but the experiments are being continued.

The Coal Trade and Shortage of Railway Trucks.

A deputation representing the Witbank Collieries, and consisting of Colonel Sandilands, Mr. Gillam and Mr. W. Pott, waited upon the Minister of Railways this week with reference to the question of the shortage of trucks on the South African Railway system. With the Minister was Sir W. W. Hoy (General Manager, S.A.R.), The deputation pointed out to the Minister how the present shortage of trucks was detrimentally affecting the position of collieries, and urged that with the diversion of traffic from the Suez Canal to the Cape route, there was at present an excellent opportunity for securing an export trade for South Africa which could be retained after the war was over by getting ships to coal at South African ports. The general mercantile prosperity would be directly and indirectly enhanced. The deputation also pointed out how the Delagoa Bay trade had increased since its coaling plant had been installed there. The Minister, in promising substantial assistance to the deputation, pointed out what heavy demands had been made on the rolling stock of the system by the campaign in German South-West Africa, and by the subsequent conveyance of troops and stores elsewhere. The exceptional circumstances of the war in Europe had also complicated the situation so far as the delivery of rolling stock to South Africa was concerned. There was, however, an order of 300 trucks in course of delivery, while the Government was placing further orders for rolling stock for the future. He appreciated fully the benefits likely to accrue to South Africa by the calling of vessels at our ports for coaling purposes, and he was confident the present congestion would be relieved in the near future.

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RHODESIAN MINERAL OUTPUT FOR DECEMBER.

Details for December and for 1915.

We have received for publication from the office of the Rhodesia Chamber of Mines (Incorporated) the following detailed statement of the mineral output for the month of December, 1915, with comparisons and values:—

MATABELELAND.

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Bulawayo District—				
Abercorn (W. J. Lane)	5	180	85·89	356
Do. (sands)	—	172	11·23	47
Andersons (Est. R Barkley)	10	1.050	36·25	150
Annasona (Matthews & Lunnun)	3	45	65·23	270
Antelope G.M. (Rhodesia), Ltd.	2B 2P 2T	3,986	878·81	3,643
Do. (slimes)	—	3.667	1,086·52	4,504
Ante Up (J. A. McMurray)	5	15	56·70	235
Bassick (Bassick Mine Syndicate)	5	112	45·82	190
Do. (sands)	--	240	50·97	11
Bessie East (T. Berwitz)	2	175	31·26	130
Big Ben	4	260	89·23	370
Do. (sands)	—	360	97·80	405
Blanket (Blanket Syndicate)	15	560	75·61	313
Bulawayo Main A. (Aserman and Cormack)	2	59	12·69	53
Do. (sands)	—	60	10·32	43
Bunney's Luck (W. H. Rabbets)	2	160	38·89	161
Bushey Park (Berwitz & Robinson)	2	84	51·08	212
Camp (Carson Mines. Ltd.), Nov.	5	515	75·60	313
Do. (sands)	—	450	38·47	160
Carry (Boomerang Syndicate)	1 H	217	137·36	569
Do. (sands)	—	130	80·86	335
Coquette (W. H. Robinson)	2	171	54·60	226
Cottage (Cottage Syndicate)	4	252	104·47	433
Do. (sands)	—	206	18·74	78
Claremont (T. J. McFarlane), slags	—	—	21·48	90
Dobie (Carson Mines. Ltd.)	5	348	242·74	1,006
Do. (sands)	—	315	27·83	115
Durhan (Durban Syndicate)	2	120	206·21	855
Do. (sands)	—	60	104·11	432
Eagle A. (Macdonald & Co.)	10	981	202·41	839
Do. (sands)	—	450	50·96	211
Eagle 2 (E. Sutherland)	—	—	2 65	11
Elumba A.	5	500	84·50	350
Do. (sands)	—	350	43·05	178
Excelsie (Excelsie Syndicate)	2	75	74·61	309
Farvic (H. S. Henderson)	5	819	215·34	913
Do. (sands)	—	435	21·35	91
Fred (Transvaal & Rhodesia Est.)	10 2P	1,700	830·64	3.443
Do. (sands)	—	1.700	182·70	757
Flora (J. L. Henderson)	2	100	38·05	158
Geelong	10	1.050	156·18	647
Godwin B. (Barrett & Stacey)	5	298	83·26	345
Do. (sands)	—	204	10·46	43
Great Belingwe (R. C. Boyes)	5	500	134·87	559
Gwen (McDonald & Co.)	(10)	141	13·70	57
Hildata A. (R. Aserman)	5	565	76·60	318
Do. (sands)	—	305	29·50	122
Intabanenda (Intabanenda Synd.)	5	420	84·82	352
Do. (sands)	—	300	19·64	81
Jeffs (Hortor & Stewart)	3	91	73·62	305
Jumpers (J. P. McCay)	5	440	207·88	862
Do. (sands)	—	180	12·55	52
Do. (slags)	—	—	16·28	68
Jumbo (A. D. Hall)	5	115	77·50	321
Do. (sands)	—	320	108·49	450
Kernel	5	130	32·63	135
Liberty (M. P. L. Syndicate)	1 H	150	13·54	56
Do. (sands)	—	125	8·96	37
Lone Hand (Armstrong & Furber)	5	390	166·60	691
Do. (sands)	—	270	61·21	254
Lonely Reef G.M. Co., Ltd.	30 3T	3,760	639·54	2,651
Do. (slimes)	—	3,760	1.775·90	7,362
Lucknow (McNamee & Ettie Syndicate), sands	—	800	44·87	186
Mamba	5	228	84·48	350
Mayfair	5	360	82·88	344
Do. (sands)	—	308	38·58	160
Matabele 3 (Criterion G.M., Ltd.)	10	580	145·18	602
Do. (sands)	—	834	33·92	141
Matabele Queens Co., Ltd.	10	1.640	380·24	576
Do. (sands)	—	1.640	339·58	1,408
Mons (Challen & Hall)	5	46	29·52	123
Mulloch (J. B. Richardson)	2	18	16·02	66
Nelly (F. D. Roscoe)	3 H	1,000	391·58	1,623
Do. (sands)	—	420	122·88	507
New Eclipse (J. R. Stewart)	5 1T	1.212	360·32	1,494
Nicholson (Cunningham & Allison), clean-up	—	—	23·81	99
Old Nic (Chart. & Gen. E. and F. Co., Ltd.)	15 4P	2 278	513·89	2,130
Do. (sands)	—	1,312	137·62	571
Peach A. (Peach Syndicate)	5	368	362·32	1,502
Do. (sands)	—	282	63·96	265
Penzance (Macdonald & Co.)	2	230	49·30	204
Do. (sands)	—	230	72·50	301
Prince Olaf (K. Johnsen)	5	220	209·22	867
Princess 2 (C. A. Abbott)	—	154	20·48	126
Do. (sands)	—	130	10·40	43
Progress (Progress Syndicate)	(5)	48	10·49	44
Queens West (Cumings & Berry).	3	212	70·53	292
Do. (sands)	—	302	65·04	270
Quest (P. M. B. Veglio)	1 H	25	23·72	98
Rex (P. D. Crewe)	5	169	47·26	196
Rubble (J. Gilpin)	5	60	10·26	43
Sabi Extra	3	40	47·02	195
Slope I. (E. E. Beecroft)	5	709	93·17	386
Southern Cross (E. Basch)	(5)	500	89·31	370
Star (Romola Nigel G.M. Co.)	5	276	101·95	423
Do. (sands)	—	123	25·84	107
Tail (Morrison & Granger)	5	350	73·33	304
Tuli	2	117	22·79	95
Wolley Dog (P. H. Davis)	2	224	352·78	1,462
Other Sources (L. & R. M. and L. Co.)	—	—	28·49	114
Do.	—	1,951	532·29	2.207
Bulawayo district total			14,523·98	60.227
Gwelo District.—				
Ardpatrick (C. Maleham)	3	315	90·16	374
Artful Dodger (A. Malcolm)	5	49	53·89	223
Bell Reef Develment Co., Ltd.	2B 1T	3,904	1.747·43	7,244
Bonsor B323 (Cornish Syndicate)	10	983	110·43	458
Do. (sands)	—	750	35·86	149
Bonsor B327 (T. Roberts)	10	800	124·29	515
Cactus (Renton & Grey)	5	336	60·86	252
Do. (sands)	—	300	54·90	228
Camelia (S. Levin), concentrates	—	50	106·93	443
Collingwood (Wanderer Selukwe G.M., Ltd.)	—	494	45·99	191
Do. (sands), Pini & Wearing	—	150	11·29	47
Csardas (Wolfshall Syndicate)	10	476	419·10	1,739
Do. (sands)	—	350	64·61	268
Do. (slimes)	—	126	14·40	60
Dream (Dream Trib. Synd.), sands	—	140	38·93	161
Falcon Mines, Ltd.	36 3T	20,004	3,068·12	12,886
Do. Copper. £13,829.				
Fed Up (A. Malcolm)	5	214	122·11	506
Gaika G.M. Co., Ltd.	5 1C	3,106	1,413·66	5,937
Do. (sands)	—	1,528	59·76	251
Do. (slimes)	—	3,628	251·27	1,050
Glen Hume (Hume, Withey and Walker)	5	700	130·65	542
Glen Rosa (Glen Rosa Syndicate)	10	1,034	471·60	1,955
Do. (sands)	—	550	155·28	644
Globe & Phoenix G.M. Co., Ltd.	40 10P	6,516	5,371·06	23,534
Do. (sands)	—	5,388	1,621·04	6,908
Do. (slimes)	—	2.122	627·41	2,660
Do. (concentrates)	—	277	515·23	2,213
Ingersoll (C. T. Uren)	2	25	14·39	60
King Solomon (A. E. West)	5	206	24·97	104
Leopard (Leopard Trib. Syndicate)	5	560	114·60	475
L'Espoir (P. Harrower)	5	75	6·88	30
Lufu (C. W. Leppington)	2	100	40·32	167
Moss (W. M. James)	5	957	522·15	2.164
Do. (slags)	—	—	89·64	372
New Dunraven G.M. Co., Ltd.	5	700	109·19	453
Do. (sands)	—	500	24·68	102
Pacific (Wanderer Sel. G.M., Ltd.)	—	222	18·40	76
Pagamesa (W. H. Peard)	15 2P	636	358·23	1,485
Do. (sands)	—	567	70·33	292

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Pondo (F. C. Luxat)	5	700	133·70	554
Do. (sands)	—	310	39·68	165
Rambler (G. G. Grant)	—	—	1·36	6
Record (Pini & Wearing)	5	400	71·03	294
Romney (T. Pedlow)	5	243	96·71	401
Selukwe Columbia G.M., Ltd.—				
Danga	10 1P	137	32·43	134
Do. (sands)	—	59	15·50	64
Wonderland	—	1,437	367·95	1,525
Do. (sands)	—	673	175·91	729
Yankee Doodle	10	1.405	250·49	1,038
Do. (sands)	—	931	106·22	440
Surprise (W. T. Woods), sands	—	405	14·89	62
Tabekwe 1/2 (A. N. Tyrrell)	20	1.917	170·08	705
Taxul (F. C. Luxat)	1 11	460	45·26	188
Do. (sands)	—	350	68·10	282
Trepolpen (C. T. Uren)	—	—	2·11	9
Trixie (S. Levin)	10	1.256	370·17	1,534
Do. (sands)	—	1.015	94·25	391
Umpali (Bolt & Franks)	5	350	80·29	333
Do. (sands)	—	300	21·58	89
Val d'Or (I. Malcham)	5	215	87·57	363
Vedas (C. Johnson)	3	285	100·22	411
Veracity (L. R. Evans)	2	85	64·89	269
Do. (sands)	—	—	59·72	247
Walrus (J. Jones)	6	90	20·39	85
Wanderer (Selukwe G.M., Ltd.)	4GR	11,720	1,337·62	5.545
Winning Post (G. M. Hughes)	—	7	20·51	84
Wolfshall (Wolfshall Syndicate)	10	150	52·50	216
Do. (sands)	—	100	10·00	41
Do. (slimes)	—	50	4·50	19
Zabonkwe (Holmes & Urquhart)	5	870	72·96	302
Do. (sands)	—	580	117·32	486
Gwelo district total			22,284·95	94,229

Matabeleland total ... 36,808·93 ozs.
Value ... £154,456

MASHONALAND.

HARTLEY DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Arlandzer (Keir & Rooke)	10	1.500	52·19	216
Do. (sands and slimes)	—	1.500	177·48	735
Baltimore & Virginia (P. A. Enke)	5	475	40·58	168
Brilliant (Mabel's Luck Syndicate)	5 1P	696	127·05	527
Do. (sands and slimes)	—	696	70·18	291
Brompton (R. R. Aitken)	5	750	114·31	474
Do. (sands)	—	500	48·42	201
Buffalo (E. A. Begbie)	5	485	115·64	479
Cam and Motor G.M. Co., Ltd.	—	12,768	4.545·13	19,271
Do. (slimes)	—	—	37·97	161
Chadshunt	5	477	421·68	1.748
Do. (sands)	—	255	43·94	182
Cirl (H. F. Wilson)	5	116	14·39	60
Concession Hill and W. Ext. (C. E. Simpson)	5 1C	1,482	181·05	1,165
(Do. sands)	—	920	50·49	209
Dalny (Macdonald & Sale)	5 1C	1,825	82·22	341
Do. (sands)	—	1.600	136·46	566
Dalny 1 W. (Macdonald & Sale)	5	510	71·30	296
Do. (sands)	—	300	41·96	174
Do. (slags)	—	—	16·21	68
Dawn (Arrow Syndicate)	5 1P	765	177·64	736
Do. (sands)	—	707	18·82	78
Eiffel Blue (Willoughby's Cons. Co.)	10	1.385	542·96	2,251
Do. (sands)	—	810	54·01	224
Do. (slimes), F. Caldwell	—	380	7·46	31
Eileen Alannah Mining Co., Ltd.	12 2T	3,966	768·84	3,187
Do. (sands)	—	5.000	1,663·85	6,897
Enny Extension (E. G. Goodyer)	5	500	103·04	427
Do. (sands)	—	300	14·47	60
Giant Mines of Rhodesia, Ltd.	30 2T	6.750	865·04	3,558
Glasgow Mines, Ltd.	5	596	139·10	577
Do. (sands)	—	280	50·08	208
Glencairn (Glenrosa Mines, Ltd.)	5	664	1,279·02	5.302
Golden Valley (J. Mack)	10	1.211	474·62	1.967
Do. (sands)	—	718	84·59	351
Guelph (J. & M. Davidson)	3	118	27·87	116
Inez (L. Highland)	10	1,680	238·58	989
Do. (sands)	—	1,000	9·37	39
Interman	5	350	96·25	399
Do. (sands)	—	300	44·03	183
Kanyemba (Kanyemba Syndicate)	10	1,080	308·19	1,278
Do. (sands)	—	660	86·78	360
Mudale (E. A. McDowell)	5	370	72·91	302
Owl (A. Rolfe)	10	1.100	1,378·86	5,716
Do. (sands)	—	1,440	562·84	2,333
Owl Extension	5	592	121·58	504
Pomposo (J. Knott)	5	334	68·96	286
Poverty (D. J. Laing)	5	750	53·05	220
St. George (J. Hussey)	2	200	89·78	372
Seigneury (Seigneury Syndicate), September	10	950	171·69	712
Do. (sands)	—	976	33·85	140
Shepherds (Phoenician (Rhod.) Co.)	5 1T	940	227·44	943
Do. (sands)	—	940	66·35	275
Seven Sevens (November)	3	80	9·40	39
Thistle Etna G.M., Ltd.	1 C	1,447	218·19	906
Do. (sands)	—	1,356	136·49	566
Trinidad	5	130	23·57	98
Victoria I.	4	200	46·17	191
Do. (sands)	—	120	11·66	48
Washington (I. J. Minnaar), pngs.	—	—	19·00	79
What Cheer (H. Moser)	5	431	234·54	972
Do. (sands)	—	675	101·03	419
White Rose	2	175	43·98	182
Zimbo	5	160	40·30	167
Hartley district total			17,275·00	72,020

LOMAGUNDI DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Colorado (Digger Syndicate)	5	358	25·66	107
Eldorado Banket G.M. Co., Ltd.	20 1C 4P	4.093	1,991·67	8,365
Do. (sands)	—	4.373	927·94	3,897
Evelyn (A. F. Graham)	2	50	14·04	58
Golden Kopje Prop. Mines, Ltd.	60 3T	12,771	1.072·54	4,505
Do. (slimes)	—	12,771	2,024·76	8.504
May (May Syndicate)	5	340	60·13	249
Do. (sands)	—	180	24·32	101
Lomagundi district total			6.141·06	25,786

MAZOE DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Botha II. (Clarkson & Sons)	1 H	2,354	38·46	159
Do. (sands)	—	830	65·34	271
Ceowara (W. M. Epton)	5	213	45·59	188
Chin (Arrow Syndicate, Ltd.)	5 1P	770	228·17	946
Do. (sands)	—	770	109·73	455
Jumbo G.M. Co., Ltd.	20	2.200	444·83	1,844
Do. (sands)	—	1,672	70·97	294
Do. (slimes)	—	528	41·39	172
Do. "Reno"	—	300	60·65	252
Do. (sands)	—	228	9·67	40
Do. (slimes)	—	72	5·64	23
Kandashaya	2	250	29·16	121
Kimberley (Mash.) G.M. Co., Ltd.	8 2T	5,350	1.184·07	5.022
Do. (sands)	—	2,300	314·46	1,334
Do. (slimes)	—	3,050	301·97	1.280
Kingsley Hoard (A. S. Warwick)	5	717	124·49	516
May	3	122	15·84	66
Micky (Micky Syndicate)	2	460	216·67	898
New Darwin (Howard & Southey)	2	40	12·31	51
Promoter (F. C. Croxford)	1 C	2,360	129·81	538
Do. (sands), B. H. Jones	—	1,700	114·39	474
S.D.C. 3 E. (B. G. Byerley)	1 H	902	75·09	314
Shashi (C. Laland). Nov. and Dec.	—	256	99·70	413
Tat (W. M. Epton). November	5	52	9·31	39
Mazoe district total			3,748·31	15.710

SALISBURY DISTRICT.—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Alpes (P. Zaffere)	5	70	140·43	582
Do. (sands)	—	162	48·38	200
Beatrice (Scott Syndicate)	10	1.010	465·97	1,932
Do. (sands)	—	630	54·18	224
Black Cat (Black Cat Syndicate)	2	210	92·15	382
Ceylon (Ceylon Syndicate), sands	—	900	128·75	534
Cross-your-Luck (Seb. and District Mines)	2 1P	248	52·39	217
Do. (sands)	—	373	80·20	332
Inyagu? (P. L. Peters), sands	—	150	13·65	57
Kenilworth (Kenilworth Syndicate)	2	146	66·25	275
Koodoo (Estate R. Tyron)	5	458	126·11	523
Do. (sands)	—	474	84·67	351
Louise Grand (H. S. Plant)	1 H	300	15·38	64
Do. (sands)	—	300	36·39	152
Mashona (H. S. Plant)	2	170	59·49	247
Mill (L. Chiappini), sands	—	600	33·22	137
Mont d'Or (Claxton & Bussell)	5	427	165·01	684
Do. (sands)	—	374		
Olympus C. (sands)	—	300	35·15	146
Planet (Planet Tribute Syndicate)	10 2P	850	247·37	1,025
Do. (slimes)	—	850	218·19	904
Radnor (London and Rhodesia M. and L. Co.)	5 2P	819	299·54	1,242
Shamva Mines, Ltd.	56 8T	51,996	2.458·45	10,326
Do. (sands)	—	27,679	6,708·35	28,175
Do. (slimes)	—	24,379		
Southern Cross (H. G. Bateman)	1 D	118	28·42	118
Salisbury district total			11.658·09	48.829

UMTALI DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Constance (J. F. Kapnek)	5	946	156·02	647
Florence (P. M. Branken)	5	23	9·95	41
Golden Frog (W. A. Hoole)	1 C	59	15·19	63
Inca (F. Young)	5	250	57·75	239
Do. (December)	—	175	22·68	94
Kent Mines, Ltd.	10	800	137·65	571
Do. (sands)	—	600	24·61	102
Lisboa (P. M. Branken)	(5)	32	4·95	20
Liverpool (R. G. Snodgrass)	5	720	82·57	343
Do. (sands)	—	300	54·59	226
Montezuma G.M. Co., Ltd.	10	1,300	127·87	530
Do. (sands)	—	800	37·63	156
Phoenician (Marjorie Syndicate)	5	109	17·95	74
Rezende Mines, Ltd.	60	11,600	1,094·68	4,645
Do. (sands)	—	3,283	250·15	1,061
Do. (slimes)	—	1,583	130·41	553
Do. (concentrates)	—	158·5	262·74	1,115
Do. (slags)	—	2·18	20·24	84
Sheepskin (P. M. Branken)	(5)	45	5·04	21
Surrey (Cawood Bros.), November	5	287	37·36	155
Do. (December)	5	400	54·75	227
Toronto (J. H. Jeffries)	2	390	36·40	151
Do. (sands)	—	240	47·71	198
Umtali district total			2,688·89	11,316

VICTORIA DISTRICT—

	No. of stamps.	Tons treated.	Yield. ozs.	Value. £
Empress (S.A. Pros. & Con. Synd.)	8	1,460	198·35	822
Do. (sands and slimes)	—	1,080	183·60	76
Ruby (E. Frankis), November	5	100	22·04	9
Do. (December)	—	—	54·77	227
Sunbeam (Douglas & Durrell)	5	772	210·13	871
Texas	10	160	104·11	432
Do. (sands)	—	100	13·34	55
Victoria district total			786·34	3,260

Mashonaland total	42,297·69 ozs.
Value	£176.920
Grand total	79,106·62 ozs.
Value	£331,376

GRAND TOTAL.

	Quantity.	Value.
Gold, ozs.	79,106·62	£331,376
Silver, ozs.	15,848·66	1,431
Copper, tons	303·33	14,893
Coal, tons	35,802·00	10,633
Chrome iron, tons	3,248·00	9,425
Asbestos, tons	260·75	4,172
Diamonds, carats	22·5	90
		£370,020

ASBESTOS.

	Tons.	Value.
Balmain (Mrs. Goddard)	15	£240
Victoria (Rhod.) Asbestos, Ltd.	59	944
King Asbestos (Rhod.), Ltd.	162·75	2,604
Regina (P. A. Nightingale).	24	384
	260·75	£4,172

GOLD OUTPUT COMPARISONS.

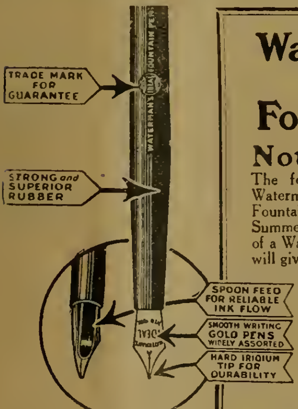
	Ozs.	Value.
November, 1915	74,877	£313,160
December, 1915	79,106	331,376
Increase	4,229	£18,216

OUTPUT FOR 1915.

	Quantity.	Value.
Gold, ozs.	915,029·36	£3,823,168
Silver, ozs.	185,231·83	17,146
Copper, tons	3,511·52	217,643
Lead, tons	27·77	557
Chrome iron, tons	60,580·75	204,910
Asbestos, tons	2,010·41	32,190
Coal, tons	309·763·00	123,192
Diamonds, carats	272·05	1,016
Copper matte, tons	9·50	285
Ironstone, tons	9,622·13	1,699
Grand total value		£4,421,806

In the year 1914 the grand total value from all sources was £3,882,996. The increase in value is therefore over half a million sterling, of which about half is due to the gold yield.

Trade During and After the War. The Council of the London Chamber of Commerce has issued the important recommendations regarding trade during and after the war, that any measures which may be considered, should provide for preferential and reciprocal trading with all parts of the Empire and the Allies, with favourable treatment to neutral countries, and the regulation of trade with enemy countries, so as to prevent a return to the conditions before the war. With a view to stimulating the development of Home manufactures, the Council also suggests steps against dumping, the amendment of the naturalisation laws of the Empire to prevent abuses, assistance to industries established during the war, and the appointment of a Minister of Commerce as a member of the Cabinet.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THE SEQUATCHIE HANDLE CO.
RAMSAY, SON & CO.: Paints, enamels, etc.
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Commerce and Industries.

Cassel Cyanide Company.

A net profit of £112,694 is exhibited in the Cassel Company's accounts for the twelve months to September 30, being about £18,500 more than that earned in the preceding year. The dividend is to be made up to 2s. 9d. per share, or 55 per cent. A year ago the distribution was 4s. per share, or 80 per cent., and £20,000 was added to the reserve; this time there is to be no allocation of the kind, but the carry-forward will be increased from £14,668 to £30,425. The dividend is now being paid on the duplicated capital, so that the distribution is equal to 110 per cent. on the former basis.

* * * *

South African Trade Prospects.

Discussing the future of South African trade in the course of his report to the Board of Trade, His Majesty's Trade Commissioner for South Africa says:—Although there is need for caution and care on the part of business men, the present depression, beginning with drought, followed by strikes, an ostrich feather slump, and the war in Europe, finally accentuated by a rebellion, is mainly artificial. The country has a great recuperative capacity, and cannot help rising again, probably soon after the difficulties of the immediate present disappear. Gold is not only the main product of the Union, providing about 60 per cent. of its exports, but it has a standard value which does not fluctuate. Diamonds form the next important product, and although (and perhaps because) the sale of the stones is regulated, price fluctuations are not really great. The demand, of course, varies, but even should the country produce only one-half of its normal quantity, the £4,000,000 or £5,000,000 decrease would not have such far-reaching and deleterious consequences as might be imagined. Wool comes next in order, being nearly 9 per cent. of the country's normal export trade; fluctuating values cannot greatly affect the importance or the possibilities of trade in this product, and there is always a more or less eager market for qualities of wool which South Africa can produce if it so wishes. The same facts apply to mohair. Ostrich feathers are, however, far less stable as a product than any others now being dealt with. As a matter of fact, the trade has been overdone. Too many farmers have been led to take up ostrich breeding by the huge profits obtained a few years ago; this has been partly responsible for prices being so much lower than were obtained in recent years, and for the use of lands for ostriches that might have been put to a better use, in that a more stable and permanent industry might have been followed. Yet this experience has not been without value. Ostrich farmers have learned to grow lucerne, which is not only highly valuable, but is a product the supply of which has never exceeded or even approached the demand. One may predict that in a few years lucerne will be used for fattening cattle prior to their exportation in the form of beef. The possibilities of South Africa as a meat producing and exporting country have hardly yet been realised; when they are, many erstwhile ostrich farmers will realise that the ostrich feather slump of 1913-14 was not an unmixed evil. One might continue to go through the list, and reach the same conclusion, namely, that South Africa has possibilities limited chiefly by its own unpreparedness or by lack of determination to achieve them. Otherwise, the only adverse factor is lack of capital. This drawback may not, of course, be soon overcome, although there is still a considerable amount of money in the Union that could profitably be employed in helping the country forward. Figures dealing with the Post Office Savings Bank are indicative of the thrift of the people. Although there are only about 1,340,000 whites within the Union, there were 242,739 savings bank accounts open on 31st December, 1914, very few of which are in the names of non-whites. The balance due to these depositors was £6,287,108, including £187,733 interest on the year's deposits. If South Africa avoids the difficulties due to the careless investment of capital, the overburdening of stores with stock, and too heavy immediate borrowing, there is room only for optimism, and there is no adequate reason why the subsequent prosperity of the country should not be ensured, or why British firms should not secure a great share in the increasing import trade that must accompany its progress.

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PUBLISHED DAILY IN FRENCH IN PARIS.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

The Dearth of Shipping—Tendency for Merchants to Conserve Stocks—South African Cement Advanced—White Lead 60s., Other Paint Ingredients the Same.

Wednesday was an important day, as three oversea mail letters arrived all in a bunch, and naturally much concern was in evidence as to the prospective result of such heavy mail matter. The anxiety is in connection with the extent to which these mails will ultimately assist in replenishing stocks in Johannesburg. Already there is a decided leaning amongst holders not to push business but rather to adopt a retiring attitude, as values are bound to advance, considering the difficulty, in the first place, to obtain goods from the British manufacturers, and secondly, to obtain the necessary shipping to bring the merchandise from the overcrowded wharves in Britain to South Africa. Perhaps one of the most absorbing topics of conversation amongst commercial men is to glean some idea as to why shipping is so scarce throughout the whole world. The subject is most entrancing, especially when one reads that the "old bullock wagons" of the sea, in the shape of sailing ships, have paid, on exceptional occasions, their cost in one voyage, which seems more like a fairy tale than reality. Here are a few of the reasons assigned for the tonnage failure. The British Government has requisitioned vessels to the extent of four figures. Loss of shipping through war conditions and wastage. Vessels interned, say for a leading example, in the Black Sea. The disappearance of German and Austrian vessels as competitors. The delays at ports through congestion is estimated to mean that it now takes three ships to accomplish the work of two under normal conditions. It is estimated that working costs have gone up 50 per cent. on steamers. A British sailing ship was sold five years ago for £2,300 and recently again changed hands for £8,800.

Commercial Exchange.

After the anxiety shown by the mining people, during the latter half of January, to replenish stores, there is just now a lull in business, but still a lot of buying in a quiet way is noticeable. The buyers are quick to recognise the fact that merchants are not anxious to sell at present rates, which, by the way, have risen from 10 to 25 per cent. since the turn of the year, in many of the everyday lines. The tendency is to keep back things where it is absolutely apparent that values must advance, not only for the extra profits, but to keep in touch with their best customers, and if perchance a pinch arises in urgently needed lines they can be supplied. On the last occasion when a similar method was adopted, it was checkmated to a considerable extent by the acute men scouring the coast ports and out of the way places to pick up goods wanted in Johannesburg, and sell them to arrive. Now this cannot well be done, at least to any extent, as Johannesburg has now secured the best stocks simply because business has become more centred here, as we have the greatest demand, and in war times railway carriage is a lesser consideration when goods are wanted badly and quickly.

The Steel and Iron Trade.

Another advance has been registered almost for everything on the list. In Britain a year ago charcoal iron was quoted at 60s. per ton and now 115s. Ordinary iron ore, in the same period advanced quite 10s. per ton. Heavy steel rails, £7; now £11. Boiler plates, £8½ to £11½. With these big advances at the manufacturers and a note of explanation added to one of the lists that fuel supplies are irregular through railway wagons being hung up for want of men to unload, there is not an over-confident feeling on our local exchange, especially as regards selling anything to arrive. The secondhand dealers have been quick to recognise this, and from the tidy appearance of their yards it would appear that all kinds of iron have been carefully sorted out and stocked, so that buyers can readily inspect the stores available. There is no such thing as old iron lying about the yards, as every scrap has been brought into ship-shape, and so prepared under a commercial heading and not relegated to the scrap heap, which happened under normal circumstances. In connection with yards, a buyer was heard to remark that the mines co-operative yards are doing very little as the mines are sorting out spares, and even broken parts, which under present conditions may be worth repairing, hence instead of selling, every mine storekeeper is conserving.

South African Cement.

The long anticipated advance in South African made cement has come at last, as 1s. per bag has been put on throughout the country. That is 1s. over and above the present rate, for example the new Transvaal prices are 8s. 3d. and 9s. 3d. for truck loads and smaller lots respectively, and 1s. has been added to the old Natal rate, and in the Cape 1s. on the former price. A lover of South African manufactures is naturally sorry that an advance has been made as it savours of some kind of an understanding with the makers, and progress has hitherto been made by the fact that the local article has been so cheap, as compared with the imported, as to force contractors to give it a trial, and subsequently, as a rule, readily adopt it. The previous shilling rise was on account of the advance in the price of bags and the other etceteras required to place the cement on the commercial market, and even this extra shilling now under review cannot be cavilled at, simply because of the increased costs of machinery and the working parts, as well as labour and so forth. Of course, the high freight is practically prohibitive against the imported cement, therefore our manufacturers have a splendid opportunity of not only capturing the market but controlling it for the future, always providing wise counsels prevail and the cement is kept up to its present state of perfection.

Building Materials, Paints, Oils, etc.

It was rather expected that timber would again advance, but the fact that contractors were slack was one of the reasons which kept the price stationary. It may be that timber merchants are not at all anxious to see local prices go ahead further, as it checks the building trade. Unfortunately these things are much exaggerated, as after all so much local material is used in the building of a house that even now the effect of the various increases only represent about £100 extra on a £1,000 house. Galvanised iron has had another rise of about a halfpenny per foot all round for the standard gauge. White lead has advanced 2s. per 100 lbs., making the Johannesburg price 60s. to 62s. 6d. There are no other alterations in the paint trade, but anxiety

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prevails as to getting goods from oversea. One merchant states that he sent an urgent message for goods and the shippers thought they could get a consignment away from the Birkenhead docks where it was sent, but subsequently had to be forwarded to another port, and although the expense was great yet that was of little consequence providing the goods had left for South Africa. This is mentioned in illustrate the difficulties and cost experienced in getting freight forward. The prices of writing and all other papers have advanced, as well as pens and other office requisites. Soft goods are getting at a premium, as a large consignment of summer goods were snapped up very quickly although they were late for the summer trade. It is said that a farmer recently could not get the value of his sacks of 6d. each for his cabbages (packed in the sacks) on the wholesale market, so he emptied the sacks and took them beck, being very disheartened that the cabbages were such a drug in the market on that morning. There seemed to be a turn for the better in farms, but at the last auction sale the biddings were, for ordinary sale purposes, practically nil.

Revised Price List.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 20s., 22s. 6d. and 25s. (local do., 15s. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 3d. lb.; drill, 5¼d. lb., tool, 7½d. to 9d. lb.; steel plates, 10ft. x 4ft. x 1-16in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 8d. per lb.; over 3 in., 7d. lb.; ½ in. up to 2½ in., 45s.; 2¼ in. to 6 in., 42s. 6d.; 6½ in. and over, 40s.; ⅝ in. up to 2½ in., 37s. 6d.; 2¾ in. to 6 in., 35s.; 6½ in. and up, 32s. 6d.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 32s. 6d.; 2¾ in. to 6 in., 30s.; 6½ in. and up, 29s. per 100 lbs. Nuts, ⅜ in., 9d. lb.; ½ in., 50s.; ⅝ in. to 1½ in., 47s. 6d.; 1⅝ in. to 1¾ in., 52s. 6d. per 100 lbs.; 2 in., 7½d. per lb.; washers, ¾ in. and under, 25s., and above that size, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £15½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 9 1-16d., 11 ft. 9 9-16d., 12 ft. 9 13-16d.; 26 gauge, 6 ft. to 10 ft., all lengths about 7d. to 7½d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 31s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. 6d. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9x3, up to 16ft., 9¾d.: over, 10½d. to 11½d. (Oregon, 10⅛d.); flooring, 4½x⅞ and 6x⅞, 5d. to 5½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 10d. to 6s. 1d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7¼d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 9d. per cub. ft.; do., large, 15s. 9d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland, 9s. 3d. per bag; 8s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport now normal; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 25s., boiled, 25s. per 5 galls.; white lead, 60s. to 62s. 6d. per 100 lbs.; turps., 50s. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 21s. to 22s. 6d.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 4s. per 12½ lb. bladders, 25s. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 7d. per lb.; White Rose paraffin, 13s. 4d. 2/5; petrol, 23s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 7s. 6d. lb.; alum, 9d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay), 57s. 6d., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 14s. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 9d. per yard; 3/20 coils of wire, 27s.; do., 3/22, 23s.; tubing, 12s. to 13s. 100 ft.; keyholders, 2s. 6d. each; round blocks, 3½ in., 3s. 6d. doz., local; lamp holder cord grips, 12s. doz.; switches, 5 amp., 10s. to 12s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 18s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

WRIGHT'S ROPES.

MINE LUBRICANTS LTD.
(INCORPORATED IN ENGLAND).

I hereby give notice that I have taken over the Sole Agency for South Africa, of the above named Company: all enquiries, orders and remittances to be addressed to me.

C. F. WIENAND.

P.O. Box 1352,
Johannesburg, 2nd February, 1916.

THE WEEK IN THE SHAREMARKET.

Strong and Active—New Features—The Re-Investment of Dividends.

The season of dividend distribution continues to be marked by steady investment buying. Though the market has, on the whole, been less active during the week, the volume of business has been satisfactory, and prices have remained firm, and likely to respond to any good influences. Bantjes and Knight Centrals had been features of the week, an improvement in the lower levels of both properties being assigned as the cause. As both stocks had been standing at low figures, they offered tempting opportunities for a small, cheap speculation. The lower-priced Far East Rand shares are favoured for a similar reason; but seem to be in danger of becoming an easy mark for the profit-snatching rumour-monger. To the investor the big producers still offer several attractions, and the splendid native labour supply now available should serve to put big properties, like the Brakpan and City Deep mines, in an impregnable position. All the smaller Neuman stocks, which have been standing at very low figures, have lately firmed up; and any Wolhuters offering have been quietly absorbed at the prevailing low price. New Kleinfonteins are still highly fancied, and the whole Modder Group continue in high favour. The Cloverfield-Welgedacht fusion has been received without enthusiasm, but has served to maintain interest in the future of neighbouring properties. Tins, at their present low prices, are being bought as a speculation, in view of the rising price of the metal; and for the smaller diamond shares there is a slight demand.

	Friday.	Sat.	Mon.	Tues.	Wed.	Thurs
		January.			February.	
	28th.	29th.	31st.	1st.	2nd.	3rd.
African Farms	8 6*	8 6	8 6*	8 9	8 6*	9 0
Apex Mines	5 3*	5 3*	5 3*	5 3*	5 3	5 4
Aurora Wests	8 6*	8 6*	8 6*	8 6*	8 6*	8 6*
Bantjes Consolidated	8 6	9 0*	9 3	9 0A	11 3	13 3
Brakpan Mines	70 6	71 6*	75 0A	75 0†	74 0*	71 0†
Breyten Collieries	25 0*	21 0	—	19 0*	19 0*	19 0*
Brick and Potteries	—	—	—	—	5 0*	—
British South Africa	—	—	11 0*			—
Bushveld Tins	—	0 3*	0 3*	—	0 3*	0 3*
Cassel Coals	—	—	—	19 6†	19 6†	—
Cinderella Cons.	4 6*	4 6*	4 9*	—	4 9*	—
City and Suburbans	34 0*	34 6*	34 9	34 6*	34 6*	34 6*
City Deeps	74 0	73 9*	75 0	74 6	74 0	74 6
Cloverfield Mines	7 10	7 4	7 4	7 2	7 6	7 6
Con. Langlaagtes	34 0	34 0	35 0†	—	34 6†	34 0
Con. Main Reefs	18 6	18 6*	19 6	19 3	19 0	19 0*
Con. Mines Selection	14 0*	—	14 0*	—	14 0	14 0*
Coronation Collieries.	25 3*	25 3*	25 0*	25 0*	25 0*	25 0*
Coronation Freeholds	0 3	0 3*	0 3*	—	0 3*	0 3*
Coronation Syndicates	2 0*	2 0*	—	2 0*	2 0*	2 0*
Crown Diamonds	2 1*	2 0*	2 3*	2 0*	2 0*	2 0*
Crown Mines Debs.	—	—	—	£100†	£100†	—
Durban Rood. Deeps	—	—	—	—	—	15 0†
East Rand Centrals	3 9*	4 0	4 0	4 0†	3 10	—
East Rand Coals	2 7*	2 6*	2 7*	—	2 7	2 8*
East Rand Deeps	1 8*	1 9	1 10	1 9	1 9	1 9*
East Rand Minings	9 6*	9 9	—	—	10 0*	10 6*
East Rand Props.	18 0*	18 6*	18 0*	18 3*	18 0*	18 0*
East Rand Debs.	£77½*	—	£77½*	—	—	£77½*
Eastern Golds	1 7†	1 6*	1 8*	1 6*	1 6*	1 6*
Frank Smith Diamds	2 6	2 7	2 9	2 8*	2 6*	2 6*
Geduld Props.	36 3*	36 9*	37 3	37 3	36 6	37 3
Glynn's Lydenburgs	10 0†	—	—	10 0†	—	—
Goerz & Co.	14 0†	13 6†	13 6†	13 6†	13 6†	13 6†
Govt. Areas	31 6	31 6	31 6	31 0	30 9	31 0
Jupiters	6 6*	7 3*	7 3	7 0*	—	7 4*
Kleinfontein Estates	—	1 7*	—	—	—	—
Klerksdorp Props.	1 0†	—	1 6*	1 6*	1 6	1 7*
Knight Centrals	13 6*	13 8	14 1*	—	14 11	16 6
Knights Deeps	—	—	—	—	23 0†	—
Lace Props.	5 1*	5 0*	5 3	5 1*	5 4	5 4
Luipaardsvlei Estates	7 6*	8 3*	8 1*	10 0†	—	8 0*
Lydenburg Farms	8 0	7 11	9 0	9 0	8 2	8 7
Main Reef Wests	7 3	7 4*	7 8	8 2*	8 4	9 6
Meyer and Charltons	97 6*	97 6*	97 6*	97 6*	97 6*	97 6*
Middelvlei Estates.	1 4	1 4*	1 4*	1 3*	1 3*	1 3*
Modder B.'s	116 6A	117 0*	119 6A	120 0	119 0A	119 0A
Modder Deeps	117 0	117 0*	118 9A	117 0*	117 6	117 0
Natal Navig. Co.	—	15 0*	—	—	—	—
New Boksburgs	—	—	1 2*	1 2*	1 1*	1 1*
New Eland Diamonds	14 0†	14 0†	14 0†	—	14 0†	14 0†
New Era Cons.	7 0*	7 3	7 6	7 6	7 4*	7 6

* Buyers. † Sellers. A Odd lots.

	Friday.	Sat.	Mon.	Tues.	Wed.	Thurs.
		January.			February.	
	28th.	29th.	31st.	1st.	2nd.	3rd.
New Geduld Deeps	3 6	3 8*	3 8	3 9*	3 9	3 8*
New Gochs	14 0†	14 0†	14 0†	14 0†	14 0†	14 0†
New Heriots	52 0*	52 6*	53 0*	52 6*	52 6*	-
New Kleinfonteins	29 0	29 9	29 9	29 6	29 3	29 0
New Modderfonteins	315 0	—	305 0*	305 0	302 6*	303 9*
New Unifieds	13 6†	10 0*	13 6†	13 6†	13 6†	11 0*
Nigels	—	—	5 0	—	5 0*	5 6*
O.F.S. Diamonds	0 · 3†	—	—	0 3†	—	—
Pretoria Cements	52 0*	52 6*	52 0*	53 6*	54 3*	57 6*
Princess Estates	3 6*	3 6*	—	3 6*	3 6*	3 9*
Rand Collieries	3 0*	—	3 3*	—	—	3 6*
Rand Klips	6 7	6 3	6 6	6 0	6 2	6 7
Rand Nucleus	2 2	2 3*	2 3	2 0*	2 2	2 1
Randfontein Deeps	—	—	3 0*	—	3 0*	3 2
Randfontein Estates.	11 3*	11 6*	11 3*	—	—	—
Roberts Victors	10 0*	—	—	10 0*	10 0*	10 0*
Rooibergs	12 0	12 3*	12 0*	12 0A	—	12 6†
Roodpoort Uniteds	7 0	6 9*	6 9*	6 9*	7 3	7 6
Ryan Nigels	4 0†	—	—	—	—	—
Shebas	1 0*	1 0*	1 0*	1 0*	1 0*	1 3
Simmer Deeps	2 0*	2 6†	2 0*	2 0*	—	1 9*
S.A. Breweries	31 0†	31 0†	—	—	—	—
S.A. Gold Mines	15 0†	—	15 0†	—	15 0†	—
S.A. Lands	3 9	3 11*	4 1	4 1*	4 0*	4 2
Springs Mines	42 3	42 9	42 9	42 3*	42 3	40 0
Sub-Nigels	11 0*	—	11 6*	11 6*	11 3*	11 6
Trans. Coal Trusts	52 6	53 3*	54 6A	54 0	52 6*	52 6*
Transvaal Lands	12 0*	12 0*	12 3*	12 0*	12 6*	12 6*
Trans. G.M. Estates	27 0†	27 0†	—	27 0†	—	27 0†
Tudors	2 0†	2 0†	—	—	—	2 0†
Van Dyks	3 6	—	—	—	3 6†	—
Van Ryn Deeps	60 6	59 6*	60 6	60 6	59 9*	59 6*
Village Deeps	34 0*	34 0*	34 3*	34 0*	34 0*	34 0
Vogel Con. Deeps	1 7*	1 5*	1 5*	1 6*	1 6*	1 7*
Welgedachts	17 9*	21 0*	23 0	23 0	22 0†	—
West Rand Cons.	8 6*	—	—	—	—	—
Western Rand Est.	1 0*	—	—	1 0*	1 0*	1 0*
Witbank Collieries.	40 0*	40 0*	40 0*	40 0*	40 0*	43 0†
Witwatersrands	54 0†	54 6†	52 0*	53 0†	52 6	53 0*
Witwatersrand Deeps	21 9*	21 6*	22 0	21 6*	21 6*	21 9*
Wolhuters	10 6	—	10 3*	10 3*	10 6*	10 6*
Zaaiplaats ins	9 9*	10 0*	10 3*	10 3	10 3	10 6

* Buyers. † Sellers. A Odd lots.

ANSWERS TO CORRESPONDENTS.

All inquiries addressed to the Editor must bear the writer's name and full address. We cannot reply to inquiries by letter, but telegrams with replies prepaid will be answered. Correspondents are requested to write their names and pseudonyms distinctly.

"Diamonds."—The cable was probably incorrect. No such desire emanated from the quarter stated.

"R.B.S."—You should consult a solicitor.

"Tin" (Capetown).—The statement was obviously too sweeping to be literally true. The property you mention will, let us hope, prove an exception.

Swaziland Tin—A Quarter's Results.

The following are the results of the operations of this company for the quarter ended 31st December, 1915:—Ground Treated, 221,492 cubic yards; tons concentrates shipped, 101 tons; estimated total profit for quarter, £4,710.

New Patents.

259. Stanley Nettleton.—Improvements relating to rope rollers.
260. Benjamin Waites and Minnie Waites.—Improvements in the classification, concentration and separation of ores, minerals, clays, alluvial deposits, or other loose fragmentary granular or pulverulent material, and apparatus therefor.
261. A. Hewitt.—Improvements in valves or cocks.
262. William Comings White.—Improvements in and relating to wireless signalling systems.
263. James Mckenzie Martyn and William George Holford.—Improvements relating to boiling tanks.
264. Joseph Herman.—Improvements in bedsteads.
265. Joseph Mirfin.—Improvements relating to laminated springs.
266. George Stanley Meikle.—Improvements in and relating to rectifiers.

Engineering Notes and News.

THE DISTRIBUTION PLANT OF THE JOHANNESBURG MUNICIPAL ELECTRIC SUPPLY SYSTEM.—III.

A Vast Municipal Area—Domestic, Industrial and Lighting Arrangements—Interesting Technical Description.*

[By J. H. Dobson, M.Sc., M.Eng., M.I.M.E., M.I.E.E., A.M.Inst.C.E.]

(a) Link Chambers and Pillar Boxes for High-tension Cables.—*Jeppestown and Eastern Districts Link Chamber.*—The high-tension feeder cables are as in 1909 and the four feeders going in the direction of Jeppestown run together as far as Albrecht Street. This point is almost two miles from the central power station, and in order to deal quickly with faults on any of these feeders a temporary link chamber was immediately erected over Natal Spruit in Commissioner Street The electrical interconnections were so arranged that the districts east of the link house could be served by any of these feeders. (This was a temporary arrangement because of the decision to erect a sub-station at a later date—explained later.) *Doornfontein Link Chamber.*—All the high-tension cables going to the Doornfontein and North-Eastern districts (Yeoville, Bellevue, etc., to Orange Grove) run together as far as New Doornfontein, and inter-linking arrangements have been provided in a chamber which also houses the group of the transformers feeding the Doornfontein neighbourhood. *Harrison Street Subway Link Chamber.*—All the five high-tension cables which provide electric light for Hillbrow, Braamfontein and Parktown districts were run into a special chamber built in the subway. At the end of each high-tension feeder in the link houses is placed an automatic circuit breaker and disconnecting links, and by means of these links and a system of busbars it is possible to feed any of the outgoing cables from any one of the incoming cables, or even to put two or more of the outgoing cables on to one incoming cable in case of an extensive breakdown between the link chamber and the central station. An important point to observe in connection with the arrangement of links and busbars in the link chambers is that the incoming cables are not arranged in parallel as they may be either on A or B phase. The arrangements as outlined have proved of immense value to the Department in dealing quickly with many cable faults that have occurred between the station and the link houses; at the same time the automatic circuit breakers have indicated at once in which direction the faults have occurred. *Pillar Boxes.*—Similar arrangements on a minor scale have been carried out in pillar boxes on various parts of the system where the cables run together past certain points. The pillar boxes thus not only form a means of splitting up the high-tension cables, but also allow of an interchange between the two cables entering and leaving the box. Automatic switch gear is not provided in any of these pillar boxes. Examples of these are at such places as Auckland Park; Nels Rust Dairies, Braamfontein; Hendon Street, Yeoville; His Majesty's Theatre; and Rand Water Board in End Street, etc.

(b) Linking up High-tension Mains to Form Ring Mains.—In several cases it has been possible to complete rings of high-tension mains, and in this way to provide an electric supply at any point from two directions. These duplicate or "ring" cables are useful not only in case of breakdown, but also to provide ready means of testing without putting consumers to any inconvenience. *Bezuidenhout Valley and Judith's Paarl.*—The high-tension cables on the North and South sides of Bezuidenhout Valley have been linked together by means of a special cable running North and South across the Valley. In this way a duplicate supply has been given to Judith's Paarl, Lorentzville, Bertrams, Bezuidenhout Valley (North and South), and Troyeville. *Parktown and Auckland Park.*—A length of high-tension cable has been run between the Parktown high-tension mains and the high-tension mains in Richmond and Auckland Park, thus affording a duplicate supply to these districts. As a further precaution, with a view to maintaining a continuous supply to Parktown and Auckland Park, the new two-phase feeder which has been run to the Zoo traction sub-station is to be looped into the Loch Avenue transformer house, and thus an entirely separate main supply has been brought into the centre of this district. *Doornfontein and Hillbrow.*—With the centralisation of the Doornfontein lighting in the underground chamber at Marlborough House, one of the Doornfontein high-tension cables has been relieved of its load, and arrangements have been installed in the transformer kiosk at the corner of Claim and Bok Streets to enable this cable to be used for feeding Hillbrow in the event of the failure of the regular Hillbrow feeder, which reaches this point by an entirely different route to the loop cable from Doornfontein. *Southern Suburbs.*—The Council entered into contracts to supply electricity for industrial purposes at special rates to a Brick and Potteries Company and a Milling Company. Advantage was taken of these supplies to complete a ring main to the southern suburbs. This served a very useful purpose on many occasions, but, owing to the increasing load due to the growth of the population in the southern suburbs, it is now impossible to feed all round on the present ring main. The Council, however, recently voted the necessary capital to run an additional cable to these districts. The scheme involves the dismantling of the present overhead two-phase mains to the Brick and Potteries Company and the laying of an underground two-phase cable of a size which will not only carry the demand for industrial purposes, but also, in case of necessity, take the whole of the lighting load of the southern suburbs as well. This leaves the outlying districts, such as Malvern, Orange Grove, Observatory, Parkview, Melville, Mayfair and Brixton, still dependent for the electric supply on one high-tension cable, but as these grow in importance improved arrangements will have to be made.

(c) Grouping of Transformers.—The grouping together of transformers which has been carried out is indicated by the rings. *Jeppestown Grouping.*—It was decided to group together the transformers contained in the six kiosks which were scattered over the area between Natal Spruit and Berg Street, and the whole of the feeders which terminated in the temporary link house were to be carried through to the site chosen for the housing of the transformers. The growth of the traction requirements in the area was such that it became necessary to put down a tramway sub-station. Accordingly, a central site was purchased in Jeppestown of an area of 50 ft. x 100 ft. for the purpose of erecting a sub-station. The building erected on this site provides for: (a) All the necessary switchgear for the linking of the four high-tension cables used for the lighting of Jeppestown and the whole of the eastern districts; (b) all the transformer gear and distributor circuits required for the districts previously served by the six separate and distinct transformer kiosks; (c) the cables, switchgear and rotary converters for the traction requirements of all the eastern suburbs. (The low-tension lighting load dealt with in this sub-station is 600 k.w. and a description of the sub-station is given later.) *Doornfontein Grouping.*—Under the heading of "Link Chambers," reference was made to the underground chamber near Marlborough House, Doornfontein. Not only has provision been made herein for an interchange between the high-tension cables running to the north-eastern suburbs (Yeoville, etc.), but there have also been installed the necessary transformers and control gear for the centralisation of the whole of the lighting of Doornfontein. The chamber is 34 feet long, 12 feet wide and 15 feet high, and is divided into two entirely separate compartments. The one contains the whole of the high-tension apparatus for the interchange between feeders as already described, and also the four transformers and high-tension switchgear in connection therewith. This high-tension switchgear is, however, operated by levers from the other compartment, which contains the low-tension switchboard controlling the low-tension side of the transformers and the outgoing circuits. The low-tension load dealt with in this chamber is 400 k.w. *Southern Suburbs.*—In connection with the electric supply to the southern suburbs, two instances of centralisation or grouping of transformers have been carried out, one in Turffontein at the corner of Hay and Tramway Streets and the other at the intersection of Prairie, Diagonal and Geranium Streets, La Rochelle. The former deals with the whole of the load of Turffontein, Kenilworth and Forest Hill. There are three 100 k.w. transformers, and the total load is 200 k.w. The latter transformer house deals with the lighting of La Rochelle and Rosettenville, and also contains the necessary high-tension control apparatus for the electric supply to Regents Park, Hill Township and Meyer's Farm. There are two 100 k.w. transformers, and the low-tension load dealt with is 100 k.w. *Belgravia and Jeppes Extension.*—The centralisation of the lighting of Belgravia and Jeppes Extension has been carried out in the transformer house situated in the south-west corner of Belgravia Park. There are duplicate high-tension mains and three 70 k.w. transformers, which deal with a total low-tension load of 175 k.w. This house also contains the high-tension control gear in connection with the lighting of Malvern, Denver and Cleveland. *Parktown.*—Arrangements were made for the centralisation of the lighting of a portion of Parktown in the transformer house that has been erected at the corner of Victoria Avenue and Queen's Road, and it is further proposed to herein deal with the loads at present fed from the transformer kiosks at Sunnyside and Queen's Place. The transformer house in La Rochelle may be taken as typical of the inside and outside appearance of the brick transformer houses erected in the Southern Suburbs, Belgravia, Jeppes Extension and Parktown. Each transformer house contains sufficient transformer units, working in parallel, to fully guard against a stoppage in supply due to the failure of any one unit, and the arrangement of switchgear and fuses on the high and low-tension sides is such that a faulty unit will cut itself out without interfering with the continuity of supply. The positions of the transformer houses, where centralisation has been carried out, have been carefully chosen so as to be in the electrical centre of the various loads dealt with, and this, combined with suitable sizes of main feeders, has greatly improved the distribution of pressure over the districts supplied. From a study of the plan of the high-tension mains, it will be obvious at once that there must be great difficulties in maintaining a good distribution of pressure over many of the high-tension cables, as instance the Yeoville feeder, which has to feed first in Berea and finally at Orange Grove, a distance of nearly three miles. This is one of the difficulties which is being gradually overcome by centralisation in proper transformer houses, wherein suitable pressure regulators can be installed as and when found necessary. An additional point to which attention might be drawn is the fact that the act of grouping together transtormers as described enables a big saving to be made in core losses, as not only can many individual smaller transformers be dispensed with, but also the number of transformers in circuit at any time can be regulated according to demand. Other suggested groupings to be carried out in the future are indicated by the dotted rings in Braamfontein, Hillbrow and Parktown, and in connection with Yeoville it should be stated that a tramway sub-station is being erected. When this is completed the future scheme is to group all the transformers in the dotted ring. The general arrangement of this sub-station will be exactly similar to the Jeppes sub-station, given in the next section.

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* Paper read before the S.A.I.E.E.

(To be continued.)

The War on German Trade.

PLEA FOR ORGANISED EFFORT.

In the course of an interesting address last week, Mr. Bernard Price, the retiring President of the South African Institute of Electrical Engineers, said that the most ambitious work yet undertaken by the Institute was an investigation of the possible development by electrical means of the natural resources of the country. The report of Electro-Chemical Industries was now in the hands of the Government. He urged that the Industries and Munitions Committee should without delay prosecute an investigation into the geographical distribution and chemical properties of raw material necessary for such industries. Proceeding, he said if the British Empire and the Allies were to consolidate the victory which they would assuredly gain over their enemies, it was imperative that they should organise victory on the new line. The industrial and commercial war which must be waged after hostilities had ceased would demand the organised effort and application of scientific and modern methods. It was all very well to advocate the boycott of enemies' goods. However effective such a policy might be, while the horrors of the war were fresh in the memory, industries must be placed in a position successfully to compete on intrinsic merits if they were permanently to retain supremacy in the markets of the world. The people of this country could do their share by developing their own resources wherever profitable, and by assisting in the better organisation of the industry and commerce of the Empire.

Handling Drill-Steel.

[By P. B. McDonald.]*

The old method of handling drill-steel at a mine, namely, getting the dull steel to the sharpening-shop on surface and the sharp steel to the miners underground, was careless. As little attention as possible was spared for this purpose. In some cases, each miner carried his dull steel to the shaft when he went up at half-shift, took the bundle up on the cage, and carried it to the blacksmith-shop; the sharpened steel he carried back in the same manner. There are many objections to this primitive method: (1) A miner should have as many miscellaneous worries removed from his shoulders as possible; his job is to mine, and he has enough to do if he does that well. (2) It is dangerous for men to crowd into a cage when each has an armful of drills to carry; a stray drill sticking into the shaft may wreck the cage. (3) If the shop is quite a distance from the shaft, as it frequently is, the task of carrying a dozen lengths of drill-steel there, perhaps through snow or rain, is exhausting to a man in wet or thin underground clothes. (4) When a miner has to carry his own steel, he will continue to use dull drills as long as possible rather than change, thus working with poor tools. Another method of collecting and distributing steel is to have one or more "drill-boys" make the rounds of the mine, hoisting and lowering the steel without danger of accidents, in much the same manner as "powder-mongers" distribute explosives underground. There is not so much objection, however, to the miners carrying dull steel to the shaft underground and sharp steel from the shaft to their places of working, so long as that is the limit, because they have to walk in and out to these places anyway. Where the mine has but a one-compartment shaft, it is a good plan to utilize the lunch-hour or any periods of time between shifts to have the drill-steel raised and lowered. Among the aids to the handling of drill-steel in use at large mines are the following: Wooden racks, either horizontal or vertical, are built on each level near the shaft, where sharp steel is kept always on hand arranged in the different racks according to lengths; then, whenever any miner wants sharp steel he merely carries out his dull drills to the shaft-station and takes back sharp sets; the racks are kept full and the dull steel is taken to surface by a special man or two. To convey the steel between the shaft and the sharpening-shop, horses and wagons can be employed advantageously; one mine has a special wagon-box which is removed at the shop by a travelling crane and lifted handily to the drill-sharpeners. Another aid to good work by the miners is to keep each contract's or gang's steel separate. Numbers correspondiug with the contract are stamped on the shank of each drill, and when sharpened each contract's drills are packed neatly in a 5-inch iron ring and held there securely with wooden wedges. Miners work to better advantage when they have individual steels. The practice of constructing a tunnel from just below the collar of the shaft to the sharpening-shop is to be commended. Such tunnels have a narrow-gauge track and push-car, and are lighted by electricity. By the use of them, drill-steel can be unloaded from the cage on to the push-car without disturbing operations around the surface of the shaft, which is always a busy place. Recent improvements in mechanical drill-sharpeners and drill-makers, and the use of special dies for forming new-style bits, such as the Carr, have tended to systematize and improve the sharpening of drill-steel. The assiduous application of the principles of scientific management has indicated the immense importance of properly-designed and correctly-sharpened bits. Drill-steel and bits are seemingly trivial, but actually are extremely significant matters. It is the drill-bit that is the critical link between the men and the rock to be removed.

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*From the "Mining and Scientific Press.

Company Meetings.

RANDFONTEIN CENTRAL.

INJUSTICES OF TAXATION.

PROFITS TAX AND PHTHISIS COMPENSATION.

The speech made by Mr. James H. Crosby, vice-chairman, who presided at the annual meeting of shareholders of the Randfontein Central Gold Mining Company, Limited, at Mayfair on the 31st of January, was notable for the attack made on the Government in respect to the operation of the profits tax and assessment for miners' phthisis compensation. Others present at the meeting were Messrs. W. H. Robinson, N. J. Scholtz, J. C. K. Pollock, J. H. Tiley, and W. H. Crawford (secretary), representing personally and by proxy 3,271,178 shares out of an issue of 4,343,700.

Mr. Crosby announced that towards the end of December the following cable was dispatched to London for publication in the Press for the information of shareholders:—

"The directors of the Randfontein Estates and Randfontein Central Companies regret the impossibility of declaring a final dividend in respect of 1915 operations. A resume of revenue and expenditure for the past year is submitted below, in which the December results are estimated.

"The revenue for the year amounted to £2,858,786. The addition of the unappropriated balance from 1914 (£101,362) and £150,000 realised by the sale of 150,000 reserve shares to meet expenditure on capital account, makes a total of £3,110,148.

"This amount has been appropriated and spent as follows:—Working costs, £2,204,588; dividend 2½ per cent. declared June, 1915, £108,592; capital expenditure, including shaft sinking, £217,100; development, £103,000; debenture interest, £171,648; debenture redemption, £86,000; contributions to miners' phthisis funds, £48,600; rates, taxes, licences and sundries £28,000; reserve to meet war charges on gold for 12 months ended September, 1915, £27,900; profits tax and special levy, £66,000; total, £3,061,728, leaving about £48,420 unappropriated and carried forward.

"Working costs have increased owing to abnormally high prices of stores due to war and water difficulties early in the year by 1s. 2½d. per ton equivalent to £150,000.

"The amount of taxation on this company for miners' phthisis is about four times as much as it should be to compensate the number of cases where phthisis has been directly contracted at Randfontein. During the three and a half years since the Phthisis Act has been in force, the compensation which this company would be liable for for phthisis cases contracted in its mines would be about £46,200, but the company has already been compelled to pay no less a sum than £178,000. This exorbitant charge is iniquitous, and the company is now taking action before the Parliamentary Select Committee with a view to urging alteration of the law bearing on the subject.

"As regards the profits tax imposed by the Government, this also is a very serious and unjust burden placed upon the company's operations.

"To give an instance, our net profit for the year 1914 amounted to £187,258, and the Government claimed no less than £57,886 profits tax, which works out at 31 per cent. instead of 10 per cent.

"Then again, Government has imposed an additional special levy of £500,000 on the gold mining industry, which brings this company's profits tax up to no less than 50 per cent. on the profits of the company.

"This year the imposition of the profits tax will be even more severe, as the company has actually made no profit, yet the Government, according to its calculations, will no doubt claim some £66,000 profits tax and special levy.

"Under these circumstances, it will be seen that the Randfontein mines are very seriously handicapped, and strong representations are now being made to Government in respect both of miners' phthisis assessments and profits tax

"The Randfontein Central Company is introducing new system of working mines, which will come into force early next year, which the board fully anticipates will have beneficial effect on company's future operations."

"Grossly Iniquitous Practice."

The latter portion of this cablegram (continued Mr. Crosby) outlines the grave disabilities under which this company suffers owing to the arbitrary wording of the Profits Tax Act, which precludes our outlay in respect of debenture interest and debenture redemption from being allowed as expenditure connected with the winning of gold. Bound by the rigid wording (as it claims) of the Act, which was passed in 1910, and wholly failed to take into account the possibility of great mining concerns being compelled to finance the mines by the issue of debentures for the purpose of development and equipment, the Government airly waves aside the huge appropriations which we have to make from the profits to satisfy the interest and redemption obligations which we have incurred in respect of our debentures, and treats them as naught. The commonsense impression conveyed by a "10 per cent. profits tax" (and I am sure I carry conviction to shareholders when I make this statement) is that of the profits of a company the Government takes ten parts and the shareholders ninety out of every hundred. How far this is from the truth a casual glance at the sorry figures I have to place before you will reveal. In actual (and grossly iniquitous) practice the proportion is more nearly reversed.

Toll to the Treasury.

I maintain that debenture interest and redemption is just as much a cost of winning the gold as is expenditure on application for mining the ore and the wages of the miners, for as the whole of the money was spent on shaft-sinking, development and equipment prior to and after the commencement of production, mining operations would be otherwise totally impossible, and there would be no profits for the Government to tax—simply virgin veld. Not only did the creation of these debentures ultimately raise profits for the Government to tax, but it enabled the carrying on of active mining on a huge scale, which in every direction, by way of Customs duties on stores and designedly excessive railway rates, besides direct taxation of European and native miners, pays toll to the Treasury.

It is a fearful anomaly that a country which still hopes to attract capital for mining ventures should so word its laws that, under an Act which purports to take but 10 per cent. of the profits of a mine, it can mulct that mine in more than half its profits, shareholders meanwhile getting nothing.

Graduated Tax Needed.

Obviously, a crying need is a tax that is graduated so that low-grade mines are not crushed out of existence, especially as every mine, from the Government's point of view, is of value to the community and to the revenue of the country in direct ratio to the scale of its operations, and I need not say that this company's operations are on a larger scale than those of any other on the Witwatersrand. Clearly, the fairest tax would be a graduated tax imposed on dividends. This is a method of taxation which is adopted by all civilised Governments throughout the world. That the Profits Tax Act is not the only exceedingly faulty piece of legislation of which this company is the victim will have been gathered from the reference to the amounts levied upon us for miners' phthisis compensation. To compensate on the very liberal scale of the Act all the men who have contracted the disease on the Randfontein mines would cost about £46,200, which is a very different sum to the £178,000 we have been forced to pay under the law, which was conceived in the spirit of regarding every mine as equally unhealthy, utterly regardless of the period of time it had been in existence and of the underground conditions.

Merits of Randfontein Central.

Without going very fully into details, I will just mention two facts that will readily show how greatly above the average in point of being free from phthisis-producing conditions this property is. Water is the chief agent for combating phthisis, as it settles the dust floating about the mine workings, and its use is insisted on in meticulous detail by the Mining Regulations. Well, our mines have so much water in them that in the early part of 1915 operations were seriously disorganised, and profits received a severe set-back on this account. This, however, is not taken into consideration, and the company is compelled to contribute to the phthisis funds an amount which is far in excess of that which it is actually liable for. Another reason why your mines are healthier is that the breaking of the rock in the stopes is done by hammer boys, who drill holes that are much smaller than those drilled by rock drills, and consequently take a lesser charge of explosive, and when blasted release a smaller quantity of dust in a confined space. The majority of mines have wider reefs to stope that permit of the employment of machines, which break the reef at a considerably less cost per ton than is possible by hand labour, but which, as shown, are far more productive of phthisis-producing conditions from the larger quantity of dust resulting from the use of rock drills. Rock drill mines, however, contribute no more proportionately in phthisis assessment than the Randfontein hand labour mines. Steps are being taken to bring these grave injustices to the notice of the Government, and it is hoped that measures will be ultimately adopted to effect those alterations that are plainly called for.

The Year's Operations.

Dealing with the operations for the past year, Mr. Crosby said:—During the year 1915 the operations of your company resulted as follows:—2,466,520 tons were milled producing 680,715 ounces of fine gold, valued, with sundry revenue, at £2,857,877, equal to 23s. 2.08d. per ton milled. Adding £754 for dividend received and the unappropriated balance at 31st December, 1914 (£101,362), the total available is £2,959,993, which has been dealt with as follows:—

Development		£203,534 12 4
Mining..		1,207,546 11 8
Hauling and pumping..		303,869 6 11
Sorting		10,823 17 11
Crushing		17,508 9 1
Transport		40,102 11 3
Milling		97,505 13 6
Tube milling..		63,592 18 8
Water service..		7,994 19 10
Cyaniding		187,982 19 2
General expenses:—		
Mine..		49,115 8 0
Head Office		12,511 5 6
Dividend No. 4, 2½ per cent., declared June 30, 1915..		108,592 10 0
Debenture interest	£171,648	
Debenture redemption	£86,400	
		258,048 0 0
Profits tax and special levy:		
For 1915	£66,000	
Underestimated for 1914	£4,131 8s.6d.	
		70,131 8 6
Licences, rates, taxes, and audit fees		18,709 14 8
Contributions under Miners' Phthisis Act, etc. ..		48,901 16 11
Reserve to meet war charges on gold ..		27,890 10 7
Interest, depreciation, etc...		10,847 6 4
Funds transferred from Appropriation Account:—		
Being capital expenditure for the year:—		
Shaft sinking	£176,537 6 0	
Development ..	99,115 5 7	
Equipment ..	44,666 16 2	
	£320,319 7 9	
Less realised by sale of 150,000 reserve shares at par	150,000 0 0	
		170,319 7 9
		£2,915,529 8 7
Actual balance unappropriated:—		
Carried forward		44,463 12 8
		£2,959,993 1 3

Disappointing Year.

Comparing the results of our operations with the previous year it will be seen that the tonnage milled is less by 27,464 tons, and the profit is reduced by £157,986. Working costs increased by £130,264, equivalent to 1s. 2.90d. per ton milled, due first of all to the extraordinary measures that had to be taken to get the mines into working order after the unprecedented floods in the early part of the year, as cabled to shareholders at the time, and secondly, to the greatly enhanced prices that have to be paid for stores in these exceptional times. For instance, some of the chemicals largely used in the reduction works have advanced from 250 per cent. to 300 per cent. in price. Then, too, our profits are affected very considerably by the additional charges, chiefly for war risk insurance, that our gold has to bear. The fact has already been notified to shareholders that it has been thought advisable to estimate the value of the gold produced at 83s. 2d. per fine ounce, instead of the usual figure of 84s. All these factors have combined to make the period under review an exceedingly disappointing one, and the position has been anxiously studied by your directors. It will be clear to you all that ore of a certain grade which it was profitable to treat under normal conditions has now, for the reason mentioned above, become temporarily unprofitable. Your board has in consequence decided to curtail the stoping tonnage from certain shafts until such time as conditions permit of the resumption of mining of lower-grade rock on a profitable basis.

Closing Down Four Mills.

I may mention that in order to obtain better results it has been decided to close down three of our four 100-stamp mills, viz., South, North, and Robinson, but to continue the working of those mines, the ore from which will be transported to the central mill, which is capable of dealing with 165,000 tons per month. The equipment of the central mill consists of 600 stamps of a capacity (with tube mills installed) of 1,000 stamps. The transport of the ore to the big mill can be undertaken with a comparatively small expenditure, due to the property being connected up throughout by standard-gauge railway lines; the only expenditure necessary is surface bin accommodation at the shaft heads, estimated to cost some £13,000. The advantages of this scheme when in full working order will be fully realised in the operations of the company. The arrangements at the big mill, being more up-to-date and embodying the latest improvements, guarantee better extraction of the ore contents. During 1915 the extraction at this plant was 95.97 per cent. on the average, and only 92.22 per cent. at the three 100-stamp mills, so that, working on the basis of transferring 75,000 tons monthly from the shafts that are at present served by the small mills, the increase in production will amount to some 900 ounces of gold per month. Besides, not only does the central mill give better extraction, but also lower working costs. Then no doubt the better supervision due to greater concentration of operations will prove of the utmost advantage. This scheme, which was mentioned in the cable dispatched towards the end of December for publication to shareholders, is being pushed ahead, and will shortly be in operation—that is to say, its inception will not now be delayed more than three or four weeks.

Effects of the War.

Owing to the taking over of the manufacturers' engineering works for the making of munitions under the Munitions Act, we have been unable to obtain delivery of the second-stage electric underground hoists, ordered before the war for three of our deeper mines, and our operations have been conducted under very real difficulties, at more expense, and at great sacrifice of efficiency in consequence. Constant touch has been maintained with the Ministry of Munitions through the kind offices of the Minister of Mines of the Union and the South African High Commissioner in London, but I regret that, no less in our own interests as in the interests of the gold mining industry generally, no favourable decision permitting the completion of work on these hoists has yet been given. I may say that the hoists are urgently required for the purpose of sinking our shafts and carrying on development in the lower levels. On reference to the ore reserves mentioned in the general manager's report it will be noticed that the reserves have been graded as follows:—

Payable.

5.4 dwts and over: 4,449,324 mining tons at 7.4 dwts.

Unpayable at present: Limit of working costs.

5.0 to 5.3 dwts.: 776,289 mining tons at 5.1 dwts.

4.5 to 4.9 dwts.: 1,302,676 mining tons at 4.7 dwts.

4.0 to 4.4 dwts.: 1,206,188 mining tons at 4.2 dwts.

Total 3,285,153 tons.

Unpayable.

3,306,859 mining tons at 2.8 dwts.

Total, 11,041,336 mining tons.

Vigorous Development.

In its present form the statement shows what proportion of the reserves will be payable when conditions again approach the normal, that is, when the influences of the war period upon working costs and revenue no longer prevail. In explanation of the gratifying increase in the total ore reserves I may say that it was decided by the board of directors to enter upon a vigorous policy of development as being in the best permanent interests of the mines, and to enable this to be carried out 150,000 of the company's reserve shares were disposed of at par to the Randfontein Estates Company and a free option given that company to take up the remaining reserve shares (156,300), also at par, extending over a period of two years.

Shareholders will realise that it was in the interests of the parent company, the Randfontein Estates, to take up these 150,000 reserve shares at par and to accept an option for two years over the remaining 156,300, also at par, as that company, being entirely dependent on the profitable working of the Randfontein Central, owing to its large holding, will derive a large proportion of all dividends paid by the Central, and this will enable the Randfontein Estates to distribute in the shape of dividends to its shareholders the amounts so derived. In these circumstances the directors of the Randfontein Estates deemed it advisable to take over the 150,000 reserve shares, and to accept the option as before mentioned.

I regret that Mr. C. A. Ferguson, the general manager of the company. died in July, 1915. His loss was severely felt by his colleagues on the board of directors. Mr. D. H. Thacker has been appointed acting general manager, and he and his staff are doing their utmost to promote the interests of the company.

Mr. W. H. Robinson seconded the motion for the adoption of the report and accounts, which was agreed to.

Sir Joseph Robinson, Bart., and Mr. J. H. Crosby were re-elected directors of the company.

Messrs. C. L. Andersson and Co. and Mr. S. Fleischer were reappointed auditors.

RANDFONTEIN ESTATES.

REDEMPTION OF DEBENTURES.

The annual meeting of shareholders of the Randfontein Estates Gold Mining Co., Witwatersrand, Ltd., was held on the 31st of January in the board-room, Mayfair, Mr. J. H. Crosby, vice-chairman, presiding over a large attendance. There were 527,431 shares represented out of an issue of 3,001,548.

The chairman, in moving the adoption of the report and accounts, said:—From the statements before you, you will see that the general revenue of the company for the year ended the 31st of December, 1915, amounted to £290,252, and the working expenditure to £10,017, leaving a balance of £280,235. The revenue mentioned comprises dividends and debenture interest received and sundry receipts. The principal item of expenditure is in connection with the running of the transfer offices at Johannesburg, London and Paris. I will now proceed to summarise the appropriation account:—

RECEIPTS.

Balance unapropriated at 31st December, 1915		£361,440
Balance of Expenditure and revenue account, for year 1915		280,235
Redemption of Randfontein Central Company's debentures held by this company	£86,400	
Less redemption of this company's own debentures	57,600	28,800
Discount earned on the debentures which we purchased for redemption on 1st March, 1915		6,511
		£676,986

DISBURSEMENTS.

Dividend No. 4 of 2½ per cent. declared June, 1915	£75,039	
Debenture interest paid out	113,074	
Capital expenditure (including £150,000 on shares)	162,184	
Sundries	6,561	356,858
Balance, unappropriated and carried forward		£320,128

Redemption Reductions.

We have again been able to purchase debentures in the open market at a satisfactory discount in satisfaction of our redemption obligations. The first instalment of £54,000 in nominal value was purchased at an average price of £91 6s. 6d. per £100. These were cancelled in lieu of the operation of redemption, in terms of the mortgage bond, due on March 1st, 1914. The second instalment of £57,600 was purchased at an average of £88 13s. 11d., and, as you will see on reference to the balance sheet, we have already bought the requisite number of debentures (£61,100) wherewith to satisfy the third instalment of redemption due March 1st, 1916. The last purchase was effected at an average of £87 3s. 3d.

Turning now to the operations of the Randfontein Central Company for the year under review. A slightly increased revenue per ton milled (0.4d.) was offset by a reduced tonnage of 27,464 (2,466,520, as against 2,493,984 in 1914), and the drop in revenue amounted to £27.722. Working costs rose by 1s. 2.90d. per ton milled to the extent of £130,264, consequently the balance of revenue and expenditure account was less by £157,986, or 1s. 2.50d. per ton. The increase in working costs was unavoidable in the circumstances, as the heavy expenditure connected with the flooding of the mines in the early part of the year (full particulars of which were cabled to shareholders at the time) and the greatly enhanced prices that had to be paid for stores during this war period were factors that could not be overcome. Besides, the company's revenue has to suffer on account of the increased charges connected with the realisation of its gold, chiefly for war risk insurance. Gold that in normal times is worth 84s. per fine ounce, after realisation charges have been paid, is now worth only 83s. 2d.

Increased Ore Reserves.

A considerable increase was effected in the ore reserves, and in this connection I have to state that on March 8th, 1915, this company purchased from its subidiary, the Randfontein Central G.M. Co., Limited, 150,000 of its reserve shares at par, and obtained a two years' free option over the remaining 156,300 reserve shares also at par. At the time of the transaction the market quotation for Central shares was below par, and on this account I wish to point out the advantage of the transaction as affecting this company. It is well known to you all that the Estates Company is the holder of the majority of the shares, as well as of the entire debenture issue of the Central. Now, when approached to take up these reserve shares, knowing that the money was required for the further development of the mines, it was considered a good investment, as the success of the Estates Company is completely bound up with the ability of its subsidiary to earn profits and declare dividends, and to increase its future profits the Central Company had to carry out a vigorous policy of development in certain of its mines.

Working Policy.

The rise in working costs and the consequent necessity of meeting the position by temporarily suspending the mining of so much of its ore as is payable in normal times but yields only a small profit during the war period, decided the Randfontein Central to close down three of its four 100-stamp mills and to utilise the full capacity of the big mill instead of only 68 per cent. thereof. The equipment of the Central mill consists of 600 stamps of a capacity (with the tube mills installed) of 1,000 stamps, and the ore from the mines hitherto served by the three small mills will in future be crushed at the Central mill. The resultant gain in increased extraction and decreased working costs will amount to a considerable sum. Cabling to London towards the end of December, for the information of shareholders through the Press, and regretting inability to declare a final dividend in respect of the year's operations, notice was drawn to the very serious handicaps which the Randfontein mines labour under as regards profits tax and miners' phthisis compensation assessments. Extended reference is made to these important questions in my remarks from the chair at the meeting of the Randfontein Central Company to which I would ask your kind attention. Following the usual custom the full reports and accounts of the Central will be sent to all registered shareholders of the Estates Company. The annual report of the manager of the electric power station is attached, and is again a record of progress. The total costs amounted to £97,620, equivalent to 0.2149d. for each of the 108,993,466 units delivered to consumer, a reduction of 1.7 per cent. in cost per unit having been achieved. The regrettable demise of one of your directors, Mr. C. A. Ferguson, occurred during the year. I now beg to move the adoption of the reports and accounts of the company for the year ended 31st December, 1915.

Mr. J. A. Yule seconded, and the report and accounts were adopted.

Mr. J. H. Crosby was re-elected director, and the meeting agreed to the re-election of Mr. S. Fleischer and C. L. Andersson and Co. as auditors.

LANGLAAGTE ESTATE.

RESULTS FOR 1915.

The annual meeting of shareholders of the Langlaagte Estate and Gold Mining Co., Ltd., was held on the 31st of January in the board-room, Mayfair. There were 202,150 shares represented personally and by proxy out of an issue of 886,500.

The Chairman, in moving the adoption of the report and accounts, said:—I have much pleasure in submitting to you the balance sheet, expenditure and revenue account, and appropriation account, for the year ended 31st December, 1915.

The property and capital of the company remain unaltered.

During the year under review 200 stamps crushed 612,297 tons (an increase of 22,678) yielding 167,599 ounces of fine gold, valued (together with sundry revenue) at £710,215. equal to 23s. 2.38d. per ton milled. Cost of production was £531,794, equal to 17s. 4.45d. per ton, to which must be added the cost of treating accumulated slimes, £13,685 (5.36d. per ton milled), making the total working costs £545,479, or 17s. 9.81d. per ton milled, and leaving a balance of £164,736, equal to 5. 4.57d. per ton milled.

This amount, added to £40,385 unappropriated at 31st December, 1914. and to £142, for dividends received, which has been dealt with as follows:—

Dividends totalling 15 per cent. (equally distributed by June and December declarations ..		£132,975
Capital expenditure		18,628
Taxation, etc:		
Profits tax, special levy and income tax	£18,328	
Licences, rates, taxes and audit fees	6,506	
Payments connected with miners' phthisis	10.024	
		34,858
Rent of Bewaarplaatsen leased from Government		4,690
Reserve to meet war charges on gold for year ended 30th September, 1915		6,953
Sundries		358
Balance unappropriated—carried forward		6,801
		£205.263

Decreased Revenue.

Comparison with the year 1914 shows that revenue has fallen by £6,482, but in this connection it must be noted that the revenue derived from accumulated slimes in 1915 was less by £42,245, than during the previous year, and in consequence the return from mining operations (together with sundry revenue) showed an increase of £35,763. The accumulated slimes, which were a source of considerable profit to the company, were finished in October.

Working costs, by constant attention, were reduced by 2.26d. per ton. No doubt you will remember that costs during the year 1914 were abnormally high, due to the inclusion of various items of extraordinary expenditure. I am pointing this out, as the reduction previously mentioned may be misleading in making a comparison with 1914, for, as a matter of fact, our level of costs during 1915 suffered considerably by the continued increase in the price of stores owing to the war.

A satisfactory feature of the operations for the year is the improved position of the ore reserves, both as regards tonnage and value. The estimate contained in the manager's report is 1,905,280 tons, classified as follows:—

Payable.—Main Reef: 440,841 tons, valued at 6.37 dwts., 54 inches over stoping width. South Reef: 720,278 tons, valued at 5.90 dwts., 48 inches over stoping width. Total, 1,161,119 tons, valued at 6.08 dwts., 50 inches over stoping width.

The unpayable tonnage was 551,791 valued at 2.49 dwts., and in addition there are 192,370 tons at present unclassified which will probably prove payable.

A comparison with the ore reserves at the end of the year 1914 discloses an increase of 274,723 payable tons at a slightly increased value.

The cubic footage accomplished for the year under notice was 61,145, an increase of 15,240 ft., and the linear footage (including 554 ft. of shaft sinking) was 14,195 feet, whereas in 1914 (including 254 feet of shaft-sinking) it was only 12.797 feet. This indicates our vigorous development policy.

Twenty-Eight Years' Service.

On reference to the manager's report it will be seen that the Langlaagte Estate Mine continues to supply a small tonnage of profitable rock to the mill, and that he expects this to continue for a few months longer. When this mine, which has served us so well during the last 28 years, is closed down, and the entire tonnage procured from Block B, a considerable saving is expected in working costs. The capital expenditure for the year (£18,628) is a satisfactory feature, as it amounted to £3,731 less than in 1914 and £6,597 less than in 1913. It was a source of gratification to your directors that they were able to increase the rate of dividend, 15 per cent. having been distributed in respect of the year's operations, as against 10 per cent. last year. We have had no difficulties with water and native labour to contend with, I am glad to say, and hope to be able to report a similar state of immunity for the coming year, but owing to the recruiting operations which have been carried on to assist in prosecuting the war in German East Africa and in Europe good miners have not been easily procurable. However, we gladly make for the Empire in these stupendous times the sacrifice that is involved in increased working costs, due to the enhanced prices of stores and in decreased revenue, the latter attributable to increased war charges on gold, which reduce the value per fine ounce from 84s. to 83s. 2d.

On the occasion of our previous meeting I said: "When I last addressed you I expected that the Government would shortly pass a Bill whereby the freehold owner's right to a half share of the proceeds of leased bewaarplaatsen would be secured. The ordinary legislative programme was interrupted by the course of events, but as the operation of the Bill will be retrospective, your share is merely deferred. In addition to as yet undefined interests, one half the rental paid for the bewaarplaatsen leased by this company will be refunded." There is no change to report in the position, but it is hoped that the Government's obligations in this regard will not be deferred unreasonably. I regret to report that in July one of your directors, Mr. C. A. Ferguson, died. His expert advice will be missed by his colleagues on the board. Mr. Hugh Mitchell continues his post of manager to our complete satisfaction.

Mr. N. J. Scholtz seconded and the report and accounts were adopted.

Mr. J. H. Crosby was re-elected a director and Mr. S. Fleischer and C. L. Andersson and Co. were reappointed auditors.

WITBANK COLLIERY.

ANNUAL GENERAL MEETING.

SOUND FINANCIAL POSITION.

Question of Railway Trucks.

The annual general meeting of the Witbank Colliery, Limited, was held on the 28th of January, when 51,519 shares out of a total of 210,000 were represented. The following shareholders were present:—Messrs. W. H. Dawe, W. H. B. Frank, D. Dreyfus, J. H. Ryan, H. A. Rogers, J. Jeppe, C. Meintjes, W. H. Evans, H. S. Darkins, A. G. Gill, and H. J. L. Panchaud, secretary. The Chairman, in his address, said:—

Gentlemen,—The directors' report, financial statements, and the reports of the consulting engineer and the manager, for the year which ended on the 31st of August, 1915, have been in your hands for some time.

You will doubtless have noted that the profit for the year shows a decrease on that for the previous financial year—namely, £67,396, as against £79,030. To some extent this decrease is accounted for by extraneous circumstances, but allowing for these, the decrease is larger than it should have been (for a reason which the chairman dealt with later and which is reported in another column).

The financial position is summarised in the directors' report, and you will notice that the credit balance brought forward at the beginning of the financial year was £76,658, whereas on the 31st of August last we carried forward a credit balance of £83,698. During the period we are reviewing, we had to pay the sum of £10,000 to the Johannesburg Municipality, in settlement of the tar contract, to which I have referred on previous occasions, and in order to maintain the company's sound financial position, which your directors consider to be not only desirable but necessary in the case of a trading company, the dividend declared for the first six months of the year was reduced to 7½ per cent., while for the second half of the year your directors were able to declare 12½ per cent. These dividends you will be asked to confirm.

Capital Expenditure.

The capital expenditure amounted to £5,485, the chief items being in connection with machinery and plant, and the equipment of the Uitspan Mine. I would point out that the amount spent on the equipment of this mine (Uitspan) is shown in the balance sheet at £40,838, and is included in the above-mentioned credit balance of £83,698. Although some time ago I suggested that it might be desirable to make special provision for this expenditure, it has not been considered necessary so far to carry that suggestion into effect.

The output for the past year was 791,323 tons, which included 100,146 tons of duff. This figure shows a decrease of 79,782 tons compared with the previous year. The number of days during which both mines were producing was 244.8, as against 274.9 for the year ended 31st August, 1914. It is particularly satisfactory to note, from the consulting engineer's report, that the seams of coal in both mines continue to show good width and quality, and also that the development is well in advance of requirements. A new electrical coal-cutter was introduced, and the results obtained would indicate that the use of this cutter will mean a reduction in the costs of this part of the mining operations, and a decrease in the number of skilled natives required for undercutting the coal.

The manager mentions that the health of the native employes continues to be satisfactory, and I think this is undoubtedly the outcome of the careful attention which this important question receives at the hands of both your manager and the company's medical officer, who at the present time is serving with the forces in Europe. One special feature which I am confident will have beneficial results in connection with your company's native employes is the establishment of a new location, which is laid out and constructed on scientific lines.

There is one reference in your consulting engineer's report which requires special attention. In referring to the decrease in the output for the year, reference is made to the disorganisation of trade caused by the war in Europe, the rebellion in the Union, and the campaign in the South-West Protectorate. The first cause, of course, affected the Oversea trade, whilst the last two seriously diminished the available supply of railway trucks, and the result was that during the seven months from September to March, inclusive, the output averaged 59,163 tons per month, whilst during the last five months of the financial year, that is, April to August inclusive, the output averaged 75,436 tons per month.

Since the close of the financial year I regret to say that the operations of your company have been seriously affected by the inadequate railway arrangements. So much has been said in the past in connection with this question of the insufficient railway facilities that one might have expected that a solution of the difficulty would have been found long ago. The following facts will show what an important bearing this question has on the work of your company, and it has to be borne in mind that all the collieries in the Witbank district suffer proportionately in the same manner. The time lost by the Witbank Colliery from September, 1915, to December, 1915, (that is, twelve months), represented an output of 140,180 tons, and from September, 1915, to December, 1915, 50,070 tons. The estimated tonnage lost by the collieries in the Witbank district for the past three years through shortage of trucks was as follows: 1913, 298,986 tons; 1914, 419,001 tons; and 1915, 502,401 tons. It is well to note that in arriving at these figures the tonnage taken is that for which the collieries concerned had orders on hand.

Present Conditions.

I am quite ready to admit that during the rebellion, and whilst meeting military requirements for the South-West Protectorate campaign, the Railway Administration was seriously handicapped. The loss and disorganisation incurred by the collieries from these causes had to be accepted as inevitable, and in a loyal spirit. Unfortunately, the question of shortage of trucks has been very pronounced during the last few months, and the failure of the Railway Administration to provide adequate facilities for the collieries has been a subject for general discussion, and has been referred to by the local Press. A deputation of colliery representatives waited on the Minister for Railways on Monday last, and I am given to undertsand that their complaint was sympathetically received, and they were assured that the Government wished to do all in its power to foster the development of the coal mining industry. It is possible that this sympathetic reference .together with the intimation that the Administration has a number of trucks on order, might lead the general public to the conclusion that the difficulty was solved; personally, I am entirely sceptical. It is easy to imagine the effect of references in the Press to this important question The Railway Administration no doubt considered that it was extremely inconvenient that the question should have beeen brought before public notice at the present time, seeing that Parliament will reassemble in a few weeks, and that one of the most important matters to be dealt with will be the Railway Estimates.

Incontrovertible Facts.

It is impossible for the Railway Administration to contradict the facts submitted by the colliery companies; therefore the only course to be adopted was to express sympathy, to promise that a more satisfactory state of affairs would be inaugurated, and to make efforts to suppply the collieries' requirements until the Railway Estimates are finally disposed; after that the old state of affairs will in all probability obtain again. In assuming the foregoing I am not drawing entirely on my imagination, as similar circumstances obtained two years ago. At the annual meeting of this company, which was held on the 23rd January, 1914, I made the following statement:—

> Your consulting engineer mentions that the output for the past year would probably have been greater had it not been for constant shortage of railway trucks. This question of the shortage of trucks was brought prominently forward a few months ago, and then received the fullest consideration of the Railway Administration and the Transvaal Coal Owners' Association. The outcome of the discussions which then took place was an assurance from the Minister that the question would receive immediate attention, and he anticipated there would be no cause of complaint in the future. This question in past years has been a source of trouble to the collieries, and, therefore, I have much pleasure in informing you that since the discussion with the Railway Administration there has been a sufficient supply of trucks.

How the Promise was Kept.

To show you how the promise of the Railway Administration was kept I should like to quote from my remarks at the annual meeting held on the 22nd of January, 1915, when I referred to the statement I have just quoted, and added:—

> Unfortunately that state of affairs did not continue for any length of time, and I think I am quite right in saying that during the past year your company has suffered as much, if not more, from shortage of trucks than it has since this question was first brought under discussion, which was some 10 or 12 years ago.

You will see, gentlemen, that I have every reason for accepting the assurances of the Minister, given a few days ago, with scepticism. It appears to me that as long as a complacent House, when discussing Railway Estimates, is satisfied with plausible explanations, instead of assuring itself of the actual facts of the case, there will be no solution of this important question.

Commission or Committee.

In my opinion the only sound way of arriving at a definite and clear opinion in regard to this question of the shortage of rolling stock would be for the House to appoint a Commission or a Select Committee, which would make a searching inquiry into the whole position. The colliery companies have continually stated the amount of their estimated losses through shortage of trucks, and I am inclined to think that if the members of the House took the trouble to obtain an estimate of the loss of revenue to the Railway Administration through the same cause during the last 10 or 12 years, the result would somewhat surprise them; they would probably find that the revenue thus thrown away would have been more than sufficient to supply all the rolling stock necessary, and leave a handsome profit. The Transvaal collieries have incurred heavy expenditure in sending their agents to Egypt and India, with a view to opening up trade with the East. The prospects were most promising, and unfortunately the great handicap in the development of this trade is that provided by the Railway Administration of the Union, in spite of the fact that the Minister has stated that the Government is so anxious to assist the development of the coal mining industry.

Major Rogers seconded the adoption of the report and balance sheet, which was agreed to.

Messrs. E. A. Wallers, A. G. Gill, and W. H. Dawe were re-elected directors.

An extraordinary general meeting, called with the object of making certain amendments to the articles of association was adjourned until next Friday, February 4.

GOLD MINES INVESTMENT CO.

The ordinary general meeting of the Gold Mines Investment Co., Ltd., was held on December 31st at 8, Old Jewry, London, E.C., Mr. J. Prinsep (the chairman) presiding.

The Chairman, in moving the adoption of the report and accounts, said that general expenses in London, Paris and South Africa were £3,430, as against £5,496 last year. The reduction was due to the new arrangement made with the Consolidated Gold Fields, whereby, as from February last, the annual fee was reduced from £5,000 to £2,500. Dividends on investments, interest on loans, etc., amounted to £28,680, as against £26,749 last year. To the amount which stood to credit of profit and loss at the date of the last balance-sheet—viz., £20,488—they had added the balance brought up from profit and loss account of £24,598, producing a balance to credit of £45,086, subject to depreciation. Contingent liabilities for uncalled capital on investments, etc., amounted to £20,000. A considerable portion of this was in respect of a loan which, at the date of the balance-sheet, they had undertaken to make, but the whole of the amount had not actually been paid over. Turning to the assets side, they had investments at book cost £513,565, from which they deducted £90,781 for depreciation, carrying out £422,783. The issued capital of £500,000 was represented by investments, loans and other assets, which, after allowing for all liabilities, were valued at £454,304. He had on previous occasions so often gone into details as to how they arrived at their valuations that he did not think he need go into it at any length this year, but he thought it was obvious that the basis of these accounts was the accuracy of the valuation. Where they had official Stock Exchange markings or brokers' quotations to fall back on they had taken them as their basis, and he was glad to say that this was the case with respect to the greater portion of their investments. Where no quotations were available the value had been estimated by the directors and managers, and he could only assure the shareholders that they had endeavoured to arrive at a fair and proper figure in every case, with the result that they estimated there was a shortage of something less than 10 per cent. between their capital and their assets. They had given a very full list of the company's principal holdings, pointing out which were dividend-payers, and he was pleased to hear the other day from a shareholder in the company, and one very well qualified to judge and form estimates of the value of the securities, that he had checked over their holdings, and that they were, in his opinion, conservative in their valuation, but even he, he noted, had to allow for some depreciation, although not to the same extent as the board had done. Shareholders would note several additions on comparing this year's list with last year's. This was not due to their having acquired new investments, except in one or two cases, such as Treasury Bills or War Loans, but to their desire to make the shareholders fully acquainted with the company's position. They would have noted that they showed a credit to profit and loss account for the year of £24,598. The income was mainly derived from interest on loans and dividends from investments, the greater part of which they had held for many years past, during which time they had been paying dividends, though their market value had been depreciating, with the result that they had now to the credit of profit and loss, but subject to depreciation, the sum of £45,000, nearly all due to annual accumulations from the sources he had mentioned. The opinion of counsel had been sought as to whether, under the circumstances, the distribution of part of this accumulated amount could be legally made in view of the depreciation in value of the investments. The directors were advised that it would not be safe to make a distribution, and they were also advised that to do so, even with the approval of the shareholders, might involve the directors in great personal pecuniary responsibility if, subsequent to such a distribution being made, a shareholder, and not necessarily one holding shares at present, but even one who might acquire shares hereafter, obtained a decision in Court against them. The shareholders would not expect the directors to take such a serious personal risk, and unless, as had been done in some cases where a similar question had arisen, a firiendly action was instituted, in order to submit the point to a Court, he did not see how else a decision was to be obtained. He and the majority of his colleagues would be glad if steps were taken to get a decision, the cost of which, he understood, would not be great. They had no creditors or anyone else whom they need consult, so the question was one which only affected shareholders, and he believed the general body of shareholders would heartily welcome such a distribution if it could be legally made, and would not object to a moderate amount having been expended to test the point, even if the decision proved adverse.

Major H. L. Spate seconded the motion, which was carried unanimously.

On the motion of Mr. Key, seconded by Mr. Weld, the following resolution was carried, with two dissentients :—"That this meeting is desirous that, if possible, the question as to whether or not the company can declare a dividend in respect of its income derived from investments, notwithstanding the depreciation in its capital assets, should be submitted to the decision of the High Court by means of a friendly action."

The retiring directors and auditors were re-appointed, and a vote of thanks to the chairman and directors concluded the proceedings.

PIGG'S PEAK DEVELOPMENT.

Exploratory Operations Give Favourable Indications.

The ordinary general meeting of the Pigg's Peak Development Co., Ltd., was held on December 29 at Salisbury House, London Wall, London, E.C., Captain F. B. Lawson (chairman of the company) presiding.

The Chairman said : Turning to the accounts, you will see that the profit realised by the year's operations amounted to £3,234 2s. 5d. : £3,000 has been written off property and machinery, leaving a net balance of £234 2s. 5d. This sum has been added to the credit of profit and loss account, which now stands at £19,772 8s. 8d. A considerable amount of development and prospecting was done during the year, but the whole of the expense was met out of revenue, and the only addition to capital account was £527 10s. 4d., representing the actual cost of additional machinery for the mine and electric power plant. Mine development stands at the same figure as last year. Nothing further was done during the year in connection with Eagle's Nest, and I do not think it will be possible to deal with this property until the war is over. Taking the various other items on the asset side, it will be seen that the balances, allowing for the payment of the dividend, are much the same as they were last year. It would be idle to regard the results of the year's operations as other than disappointing. The grade of the ore, especially in the New Section mine, has dropped to a value far below our expectations, and the ore reserves estimated by Mr. Sharpley (the manager) in his report, which is published with the accounts now before you, combined with this fall in values, oblige us to look upon the position at the mine as a serious one. Mr. Sharpley has been on leave in England, and the directors have had the opportunity of personal consultation with him and with the consulting engineer. Although both these gentlemen agree that the position is serious, yet they do not look upon it as desperate. It is evident that Mr. Sharpley's estimate of reserves was made on a very conservative basis, inasmuch as 18,870 tons have already been crushed since the estimate was made, and there is no word of the reserves being exhausted. The Pigg's Peak mine, as I have often told you before, cannot be judged by the ordinary standard of a quartz mine, as the ore occurs in lenses, and there is always the chance of striking a new lense by carrying out systematic exploratory work.

Encouraging Development Work.

There are many places in the mine which Mr. Sharpley considers are well worth such exploratory work, and this work he has laid out. It is now being pushed on by Mr. Allen, who has temporarily taken Mr. Sharpley's place as manager during his absence in Europe. Especially good are the chances of striking something well worth having in the New Section mine, where the ore gives greater promise of continuity than in the Old Section. Mr. Sharpley also advised further prospecting in the neighbourhood of the Devil's Reef, where the find of rich ore was made some few years ago, and in opening up here the acting manager reports that his work has already disclosed a reef which has a promising appearance, and even now carries small values. This work is being carried on. Work is also being pressed forward at a point located by Mr. Sharpley as the probable western extension of the Peak lode. The future of the mine depends upon the discovery of new ore bodies, and although we have nothing positive to go on yet, we have the considered opinion of our manager and our consulting engineer that such discovery is not only possible, but probable. Everything is being done to carry out development on the lines indicated by them. In conclusion, I would like to say a word about our colleague, Mr Ehrlich, who is retiring from the board. Mr. Ehrlich's connection with this company has been a long one, and I am not exaggerating when I say that it is entirely due to Mr. Ehrlich that the company to-day possesses either property or mine, or, in fact, that it is in existence. At the time when the outlook of the company was at its blackest, and the company entirely without funds, Mr. Ehrlich came forward and advanced, without security, sufficient money to provide a mill and plant. He has always taken the keenest interest in its affairs, and I can tell you that he will leave a place at the board table which it will be impossible to fill. With the present position of the company, it is not now proposed to elect another director in his place. The Chairman concluded by moving the adoption of the report and accounts.

Mr. G. Freeman, J.P., seconded the motion, which was carried after a short discussion.

Captain F. B. Lawson having been re-elected a director, Mr. Charles Fox, F.C.A., was reappointed auditor, and the proceedings terminated.

NEW TRANSVAAL CHEMICAL.

Effects of Capital Rearrangement. Substantial Increase of Profits.

The twentieth ordinary general meeting of the New Transvaal Chemical Company, Ltd., was held on January 6 at Winchester House, Old Broad Street, London, E.C., Baron Emile B. d'Erlanger (chairman of the company) presiding.

The Chairman, in moving the adoption of the report, said : These are the first accounts submitted to you since the rearrangement of capital consequent upon our agreement with Messrs. Lever Brothers, duly sanctioned by you last year. Concisely put, the old participating Preference shares were converted into First Preference shares, bearing a 6 per cent. cumulative dividend, but not participating in any extra profits, and they received a bonus of 15 per cent., payable on the same First Preference shares. The old Ordinary shares were converted into "A" Preference shares, entitled to a cumulative dividend of 8 per cent., but not participating in any surplus profits, and they also received a bonus of 15 per cent. in Six per Cent. First Preference shares. This operation accounts for the issue of £200,000 First Preference shares and £150,000 "A" Preference shares, of which, however, at the date of the balance-sheet £626 remained to be issued. Messrs. Lever Brothers hold the entirety of the £150,000 Ordinary shares issued, entitled to the surplus profits after the £24,000 required for the dividend on the Preference shares. The gist of the arrangement with Messrs. Lever Brothers is that the old Participating Preference shareholders and the old Ordinary shareholders relinquish the speculative element of profit attaching to Ordinary shares for a better-secured preferential and cumulative yearly dividesd of a fixed nature. Figuratively speaking, they ceased to be active partners and became sleeping partners. The question I will put myself in examining the accounts, and which, in the light of the figures before us to-day and the progress made since 30th June, I hope to answer to your satisfaction, is: "Can the public, among whom the First Preference and "A" Preference shares are so widely distributed, sleep safely upon their investment?" My solicitude is not, however, confined to the investing public; it is none the less for the Ordinary shares, though held entirely by one firm, Messrs. Lever Brothers. Having been connected for so many years with this company as its chairman, having seen it emerge triumphantly from the tribulations of childhood, live for many years a life of great prosperity, and then momentarily fall a prey to adverse and fickle fortune, I am deeply interested, from the moral as well as the material point of view, in witnessing its return to financial strength and commercial prosperity, and to see Messrs. Lever Brothers reap a rich harvest from the seed they have sown.

The Balance-Sheet.

To return to the balance-sheet, the total share capital is now £500,000. There is a Debenture debt of £19,500 and £110,000 secured advances, forming part of a credit of £150,000 opened to us by the National Bank of South Africa at a very reasonable rate of interest. You may rest assured that our assets on the right-hand side of the balance-sheet adequately represent our liabilities. The largest item on the credit side is investments, £403,000. These include £150,000 Fifteen per Cent. Lever Brothers Preference shares, valued at £150,000, though officially quoted at about £2. The investment in the South African Oil and Fat Industries, Ltd., our subsidiary, amounts to approximately £200,000, one-third of which represents share capital and the remainder advances. Our subsidiary has for several months been earning regular and substantial profits. Our next largest investment is in the Premier Whaling Company, from which we derive a great deal of raw material. It made a profit of £5,000 in 1914, and the results of 1915 are expected to be about the same. We also have £24,000 invested in the Machavie mine, from which we have so far derived no dividend. Our stocks on hand amount to £101,000, our debtors to £71,725, bills receivable to £17,200, and cash to £2,800. Each item is worth its full book value. Ignoring the stocks of our subsidiary, and taking Lever shares at market value, our liquid assets exceed cash liabilities by some £350,000, or, if we include the South African Oil and Fat Industries stocks, by well over £400,000—a very strong financial position indeed. It being desirable that the company should be independent of permanent banking facilities, Messrs. Lever Brothers have asked that the Ordinary share capital should be increased by £150,000 by the creation of Ordinary £1 shares, the right of subscription to which is, in the first instance, reserved to the Ordinary shareholders at par. The trading profit of the New Transvaal Chemical Company proper amounts to £36,349, as compared with £27,256 in 1914 and £35,557 in 1913, a proof that we have turned the corner. We have to add £22,500, the dividend on Lever shares, and have a distributable profit of £35,000, against £9,500 in 1914 and £23,000 in 1913.

Mr Cæsar Schlesinger seconded the resolution, which was carried unanimously.

The dividends were formally declared, the retiring directors and auditors re-elected, and a resolution authorising the issue of 150,000 new Ordinary shares of £1 each was agreed to.

New Vaal River Diamonds.

Diamonds registered for December, £10,000, as compared with £7,000 for November. "Since the termination of the campaign in the territory formerly known as German South-West Africa, our diggers have been gradually returning to our property, although their number is still less than half of those who were at work before the outbreak of hostilities. The average price realised for diamonds during November was £5 12s. per carat, and during December £6 13s. 4d. per carat, which compares with the average price of £3 16s. 10d. per carat obtained during the first six months after war was proclaimed."

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Southern Angola as a Market for Cape Products.

"The protective system at present obtaining in Angola must be modified in the very near future," says Consul Beck in his annual report, "and in that event this territory should form a natural outlet for the products of the important industrial development which has taken place in the Cape Colony during the last ten years. Commercially speaking, Angola should form part of South Africa. In the sub-continent the line of economic and industrial advance has for centuries been from the south, and not from the north, and there is no obvious reason, except the existence of a temporary hostile tariff, why Angola should be the exception. On the extension, a few years ago, of the Cape-to-Cairo Railway, Bulawayo became, owing to Rhodesian initiative and enterprise, the commercial base of Katanga. Within easy reach as Lobito is of Capetown, it should be a lighter task for manufacturers in Cape Colony to obtain a commercial footing in Angola. Moreover, in the absence of German competition the present moment would appear to be opportune for improving communications between the Union of South Africa and this portion of the west coast, which since the outbreak of hostilities has been served only by the Empreza Nacional. It is possible that some British line will adopt the all-round route previously followed by the Deutsche Ost-Afrika Linie. In the meanwhile Cape manufacturers might study conditions in Angola which they have hitherto largely neglected. The journey from Capetown to Lobito (1,250 miles) is not a long one, and it is suggested that they should send commercial travellers to this territory, for catalogues and circulars seldom receive more than scant consideration, whereas a capable traveller, speaking Portuguese, would command attention. For additional information British firms in Cape Colony should apply to His Majesty's Trade Commissioner, George Street, Capetown."

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DIRECTORS' REPORT

For the Year ended August 31st, 1915.

Submitted to the Fifteenth Ordinary General Meeting of Shareholders, held in the Company's Board Room, Cullinan Building, Johannesburg, on Friday, the 28th January, 1916, at 12 noon.

To the Shareholders.

WITBANK COLLIERY, LIMITED.

Gentlemen,—Your Directors beg to submit their Report, together with the Reports of the Consulting Engineer and the Manager, for the year ended 31st August, 1915, and the Financial Statements made up to that date.

PROPERTY.

Your Company's property holdings remain as last reported, viz. :—

	Morgen.
Witbank, Freehold	2,428
Joubert's Rust, Freehold	1,057
Uitspan, Freehold	225
Portion of Blesboklaagte, Mineral Rights	506
	4,216

equal to about 8,920 English acres.

MINING OPERATIONS.

The Reports of the Consulting Engineer and Manager give full details of the past year's operations.

From the attached Statements it will be noticed that the output reached a total of 791,323 tons, being a decrease of 79,782 tons upon that of the preceding year.

FINANCIAL.

The Appropriation Account for the twelve months under review may be summarised as follows :—

Balance brought forward from previous year		£76,658 7 6
Profit realised during the year		67,396 4 9
Interest, Rents and Sundry Revenue		1,428 3 4
		£145,482 15 7
Less—		
Audit Fees for previous year ...	£262 10 0	
Government Tax on profits for previous year...	3,691 7 0	
Income Tax to 30th June, 1914...	1,841 15 6	
Capital Expenditure for past year	1,681 17 1	
Dividends, Nos. 20 and 21, declared during the past year	42,000 0 0	
Directors' extra remuneration ...	1,500 0 0	
Tar Contract Settlement	10,000 0 0	
Sundry Items	806 11 10	
		61,784 1 5
Leaving a balance to be carried forward of		£83,698 14 2

The following items of Capital Expenditure have been incurred during the past year :—

Buildings		£742 0 5
Machinery and Plant		2,271 9 0
Reservoirs, Surface Works, etc.		94 18 10
Uitspan Equipment		2,376 16 6
		£5,485 4 8
Less—		
Received by sale of Freehold Stands in Witbank Township	£1,242 0 0	
Furniture, Livestock, Vehicles and Harness written off	181 11 2	
		1,426 11 2
		£4,058 13 6

DIVIDENDS.

On the 28th February, 1915, your Directors declared an Interim Dividend No. 20 of One Shilling and Sixpence per share (7½ per cent.) for the first half-year, and on the 31st August, 1915, a Dividend No. 21 of Two Shillings and Sixpence per share (12½ per cent.) for the second half-year, making 20 per cent. for the year.

You will be asked to confirm your Board's action in the matter.

WITBANK TOWNSHIP.

It will be observed from the Notice to Shareholders embodied in this Report that a Special General Meeting of Shareholders has been convened to follow immediately after the Annual Meeting on the 28th January, 1916, for the purpose of considering and, if thought fit, passing a Resolution authorising the extension of the objects of the Company. This Special Meeting has been convened, as your Directors wish to enter into an arrangement with the Company's Township at Witbank for the supply of electric light, which can be done at a small capital cost and a profitable basis, but are advised that there is a doubt as to whether, from a strictly legal point of view, they have the necessary authority under the Company's Articles of Association.

In the event of such Resolution being adopted it will be submitted for confirmation at a subsequent meeting called for the 19th February, 1916.

MANAGEMENT.

Your acknowledgments are due to your Consulting Engineer, Mr. D. Wilkinson; to your Manager, Mr. J. K. Addie; to your Business Manager, Mr. F. A. Gillam, and to the Staff generally, for the zealous and able manner in which they have carried out their duties during the past year.

DIRECTORATE.

In accordance with the provisions of the Company's Articles of Association, three of your Directors, Messrs. E. A. Wallers, A. G. Gill and W. H. Dawe, retire from the Board by rotation, but, being eligible, they offer themselves for re-election.

AUDITORS.

The retiring Auditors, Mr. J. P. Ablett and Messrs. C. L. Andersson and Co., being eligible, offer themselves for re-appointment. You will be asked to appoint auditors for the current year and to fix the remuneration for the past audit.

We are, Gentlemen,

Obediently yours,

W. H. DAWE, *Chairman.*
J. H. RYAN,
H. A. ROGERS,
R. GOLDMANN,
J. JEPPE,
C. MEINTJES,
P. DREYFUS,
W. H. B. FRANK,
Directors.

Johannesburg,
5th November, 1915.

Witbank Colliery, Limited—continued.

BALANCE SHEET, 31st August, 1915.

Dr.		
To Capital—		
210.000 shares of £1 sterling each, fully paid		£210,000 0 0
,, Share Premium Account . . .		10,412 10 0
,, Funds Transferred from Appropriation Account—		
As per last Account	£93,886 10 1	
For Capital Expenditure for year ended August 31, 1915	1,681 17 1	
		95,568 7 2
		£315,980 17 2
,, Sundry Shareholders—		
Dividends Nos. 19 and 20	119 3 10	
Dividend No. 21, declared and unpaid	26,250 0 0	
		26,369 3 10
,, Sundry Creditors, etc.—		
Trade Accounts, Native Wages, Railage, etc.		11,786 0 1
,, Balance—		
Appropriation Account		83,698 14 2
Contingent Liability on Shares—		
Witwatersrand Native Labour Association, Ltd., 309 shares at 8s.	£123 12 0	
		£437,834 15 3

No provision has been made for the Government Tax on Profits for the year ended 31st August, 1915, and Income Tax.

Cr.			
By Property—			
Freehold, Mining Rights, etc., as per last Account		£126.722 7 4	
Less—Stands sold in Freehold ...		1,242 0 0	
			£125,480 7 4
,, Buildings			34,837 2 4
,, Machinery and Plant			129,549 7 5
,, Railway Sidings and Equipment ...			9,385 2 0
,, Shafts and Development			6,185 9 6
,, Reservoir, Surface Works, etc. ...			4,894 18 11
,, Furniture		975 16 0	
,, Livestock, Vehicles and Harness ...		778 14 2	
			1,754 10 2
,, Investments—			
Rand Mutual Assurance Co., Ltd.:			
50 shares of £10 sterling each, fully paid		500 0 0	
Witwatersrand Native Labour Association, Ltd.:			
309 shares, 12s. paid up and 25s. per share deposit		571 13 0	
Transvaal Coal Owner's Association, Ltd.:			
2,700 shares of £1 sterling each, fully paid	£2,700 0 0		
63 shares of £1 sterling each, fully paid at £1 18s. 10d. per share ...	122 6 6		
		2,822 6 6	
			3,893 19 6
,, Uitspan Equipment Account... ...			40,838 9 8
			£356,819 6 10
,, Stores on Hand			9,153 1 8
,, Bags in Circulation			79 3 4
,, Stocks of Coal, Tar and Bricks on Hand			2.401 5 7
,, Sundry Debtors, Payments in Advance, etc.			22.499 15 7
,, Cash—			
Current Account, Johannesburg ...		33,524 5 10	
Current Account, London		141 17 2	
Deposit Account, London		10,000 0 0	
Dividend Accounts		119 3 10	
Cash at Mines		3,096 15 5	
			46,882 2 3
			£437,834 15 3

H. G. L. PANCHAUD, Secretary.

W. H. DAWE, Chairman.
J. H. RYAN,
H. A. ROGERS, Directors.

To the Shareholders,
WITBANK COLLIERY, LIMITED.

We have audited the Balance Sheet of the Witbank Colliery, Limited, dated 31st August, 1915, above set forth. We have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the Company's affairs to the best of our information and the explanations given us and as shown by the Books of the Company.

C. L. ANDERSSON & CO.,
Incorporated Accountants (Eng.),
J. P. ABLETT, F.C.P.A., Auditors.

Johannesburg, 2nd November, 1915.

Witbank Colliery, Limited—continued.

APPROPRIATION ACCOUNT for the Year ended 31st August, 1915.

Dr.		
To Auditors' Fees— For year ended August 31, 1914		£262 10 0
,, Government Tax on Profits— For year ended August 31, 1914 ..		3,691 7 0
,, Income Tax Paid in Johannesburg— For period ended June 30, 1914 .		1.841 15 6
,, Expenditure on Capital Account— Capital Expenditure during year ended August 31, 1915		1,681 17 1
,, Dividend No. 20 (7½ per cent.) ...	£15,750 0 0	
,, Dividend No. 21 (12½ per cent.) ...	26,250 0 0	
		42,000 0 0
,, Directors' Extra Remuneration— For the year ended 31st August, 1915, in accordance with Articles of Association		1,500 0 0
,, Township Expenses		81 12 6
,, Income Tax Paid in London		7 2 2
,, Tar Contract Settlement— Amount paid to Johannesburg Municipality in respect of claim re Tar Contract		10,000 0 0
,, Amount written off— Expenditure re Option abandoned, etc.		717 17 2
,, Balance— To Balance Sheet		83,698 14 2
		£145,482 15 7

Cr.		
By Balance— Appropriation Accounts, August 31st, 1914		£76,658 7 6
.. Balance— From Revenue and Expenditure Account, being profit for year ended 31st August, 1915		67,396 4 9
.. Sundry Revenue— Stand Licences, Survey and Transfer Fees	£102 9 0	
Interest and Rents	1,325 14 4	
		1,428 3 4
		£145,482 15 7

H. G. L. PANCHAUD, Secretary.

W. H. DAWE, Chairman.
J. H. RYAN,
H. A. ROGERS, Directors.

C. L. ANDERSSON & CO.,
Incorporated Accountants (Eng.),
J. P. ABLETT, F.C.P.A., Auditors.

Johannesburg, November 2, 1915.

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NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 1½d.

CONTENTS.

PAGE
Notes and News ... 551
Topics of the Week:
The Coal Industry and the Railways ... 553
Geology and Rand Mining ... 533
Three Views of the Industry ... 534
Rand Earth Tremors Committee's Report ... 555
Kimberley and the Projected Diamond Fusion ... 557
Recent Results from Goerz Mines ... 558
January Output Maintains High Standard ... 559
Rand Metallurgical Practice.—III. ... 560
January Output and Group Returns ... 561
Pulmonary Diseases Among American Miners ... 563
Correspondence and Discussion: "The Coal Industry and the Railway," "Red Cross Mine Ambulance Competitions," "The Life of the Wolhuter" ... 564
Commerce and Industries ... 566
The Week in the Mining Material and Engineering Trade ... 567
The Week in the Sharemarket ... 569
Engineering Notes and News ... 570

Notes and News.

Earth Tremors Committee.

We print this week a first instalment of the report of the Earth Tremors Committee, some extracts from which have already appeared in the daily papers. The report, it will be seen, follows closely the "weight of evidence," as they say in the Courts, and besides being a masterly diagnosis of the trouble, makes a series of valuable recommendations for future guidance. The first feeling on reading the report will be one of relief that the tremors are due to purely artificial causes, and that it was not anticipated that they will become very much worse. The advice given to the mines seems very sound and timely; and we may expect it to result in increased attention to the matter along lines already being followed. We hope to return to the subject in our next issue, and to give some particulars of what has been done in drilling sand-filling holes by means of the McNamara Shot Drill.

* * * *

The Coal Rebate.

The coal owners have received a notification from the Railway Administration to the effect that the rebate of 1s. upon coal exported as cargo from Durban and Lourenco Marques, and also upon coal bunkered at Capetown, will be discontinued as from the 1st April, 1916, and are meeting to discuss the position. In the bunkering contracts there is a clause which passes on to the shipowner any increase in railway rates, so that Capetown agencies will not be affected, whilst the railways will have the benefit of the non-payment of the rebate. Coal bunkered at Natal and also at Lourenco Marques has not received a rebate, but agents at both of those ports have been refunded 1s. for every ton of 2,000lb. of coal exported. The reason why Capetown agents received a rebate on coal bunkered was because when the system was introduced no discrimination was made as to the port of destination of the coal exported and Natal agents received a rebate on coal exported to the Cape, regardless as to whether it was to be used for bunkering ships there or not. Naturally, the Johannesburg coal owners objected, with the result that the Government allowed a rebate on all coal shipped at Capetown—it was all for bunkers. The net result of the new order is that the full railway rate of the overland coal traffic will accrue to the Administration, and that the railway rate on export coal via Natal and Lourenco Marques will be increased by 1s. In the case of Durban the rate will now be 6s. 6d., which is the amount charged for bunker coal. The matter is further dealt with in our leading columns.

* * * *

The Wave System of Power Transmission Applied to Rock Drills.

Among recent arrivals on the Rand is Mr. H. Evelyn Haddon, the sole concessionaire of the new system of power transmission known as Wave Transmission. A company is, we understand, about to be formed locally to work this system on the Rand gold fields, particularly in connection with rock drills. The principles of this entirely novel system of transmission are not yet available for publication. We have been privileged, however, to read the reports of two engineers, Mr. David Gilmour, the well-known Rand mechanical engineer, and Dr. Dugald Clerk, the eminent London mechanical engineer. These reports show clearly that the development of the system as applied to rock drills has reached a very practical stage, and that the advantages over air drills, especially in economy of power and maintenance, promise to have far-reaching effects on mining costs of the future. The Imperial Government has recently placed orders in London for Wave Transmission equipments, and large commercial developments are expected in the current year.

* * * *

Welgedacht and Clovers.

In our last issue we printed a paragraph dealing with an alleged provisional agreement between the Cloverfield and Welgedacht Companies. The paragraph was based on an article that had appeared under big headlines on the cable page of the *Rand Daily Mail* of the previous Saturday. That article professed to have authority to announce that an agreement had been concluded between the two companies. On the following Wednesday, February 2nd, a ten-lined letter signed by the secretary of the Cloverfield Company appeared in the *Rand Daily Mail*, hidden beneath "Shipping Intelligence." A letter to the same effect from the same source appeared in a corner of *The Star* of the previous evening. We frankly confess that the letter escaped our notice, as we have reason to believe that it escaped the notice of many other people interested. As we fully expected to receive some official information regarding the statement of the *Rand Daily Mail*, and as it has been customary for this paper to be favoured with copies of all official notices emanating from the office of the Cloverfield Company, we never thought of searching the daily papers for a reference. As is known to most of our readers, we have to go to press early in the week, and owing to the pressure of other matters demanding space, we had to content ourselves with merely placing the *Mail's* statement on record, hoping to give it extended attention in our succeeding issue, when we would doubtless have supplementary official particulars to go upon. We, naturally, much regret the publicity given in our columns to the *Rand Daily Mail's* incorrect statement, but would respectfully ask the secretarial offices of the mining companies to favour us equally with the rest of the Press, with official statements for which they desire publicity. At the same time, one cannot help expressing surprise at the curious attitude of the *Daily Mail* in the matter. Five days after they announce authoritatively the coming amalgamation, they correct it by printing a short letter from the secretary below shipping news. Not a word of explanation is vouchsafed as to the authority for the original statement, nor is reason offered for the differentiation between the publicity given to the announcement and the obscure form of the contradiction. Surely the *Mail* owes the public some sort of explanation?

* * * *

State Mine's Share Valuation Error.

A strange mistake has been made by *The Statist* in an interesting and lengthy estimate of the producing mines of the East Rand, lives and dividends of some of the In a table, which gives the tons milled per annum, together with an assumed probable profit per ton and net profit thereon after deducting 15 per cent. for Government and phthisis taxation, etc., the Government Areas is included with the other mines of the neighbourhood as follows:—

	Tons milled.	Say profit per ton.	Mine profit.	Net profit	Div. p.c.	Equals.
Government Areas	1,100,000	6/6	£357,000	£303,975	20	£280,000

The net profit is that remaining after the 15 per cent. deduction as aforesaid. In a previous article on the Government Areas alternative recoveries of 25s. and 30s. are given, with an average working cost of 17s. 6d. on a crushing of 1,100,000 tons per annum, and the profit of 6s. 6d. shown evidently refers to the case of the lower recovery. In any event, the fact that 15 per cent. is deducted for Government tax and the like, makes it clear that in this estimate the Government Areas are being dealt with on the same basis as the other companies referred to. This is an oversight, of course. If 6s. 6d. is the profit on a recovery of 25s., it is equal to 26 per cent. of it, and, according to the terms of the contract, the Treasury would be entitled to 26 plus 10 per cent., or 36 per cent. of the profit, and not a portion of the 15 per cent. as estimated. The balance accruing to the company would thus be 64 per cent of 6s. 6d., or 4s. 2d., which is equal to a total sum of, say, £229,200 on the output, a difference of £50,800. The dividend, supposing that all the profit were distributed—which would not be the case by any means—would be 16·3 per cent., instead of 20 per cent. as stated on the strength of this estimate of 20 per cent. *The Statist*, allowing 10 per cent. as remunerative interest, and 5 per cent. for purposes of redemption of capital, calculates that a 40 years' life makes the shares of the Government Areas worth 37s., the market price at the time of writing being quoted at 30s. Without going further into the calculation, it appears to us that the correction made would bring the estimated value down to the market quotation or thereabouts.

* * * *

Brakpan Mines.

An interesting and somewhat lengthy review of the position of the Far East Rand Mines appeared recently in *The Statist*, and it is shown that, in the opinion of the reviewer, the shares of some mines are being quoted in the market at a higher price than their actual value, according to the basis of calculation adopted, while others, on the contrary, are being bought at a lower figure than they are intrinsically worth. In the former category is included the Brakpan Mines. There appears to be something wrong in the estimate of the Brakpan life that has been made by *The Statist*. The figure quoted is 15 years, with an area of 1,150 claims, or a milling tonnage of 12,000 tons per claim. However, this may be, it must be remembered that the area available for the purposes of the company, outside the limits of the claims actually marked off, is still very extensive, and from this point of view alone, without making allowances for any other conditions that may have been insufficiently appreciated by *The Statist*, the life and prospects of the concern are vastly better than they have been made to appear. We propose to deal with the matter more fully upon a later occasion.

* * * *

Economical Working.

The report of the Transvaal Chamber of Mines for the month of December shows some interesting facts regarding the great economy which has been achieved in working expenses. The Glencairn Main Reef, for instance, shows working expenses to have been 12s. 7d. per ton, and the company crushed 22,000 tons of ore, yielding 3·32 dwts., and making a profit of 1s. 6d. per ton. The Knights Deep crushed 105,000 tons, which yielded 3·88 dwts. per ton, and made a profit of no less than 3s. 2d. per ton. The May Consolidated crushed 14,730 tons of rock, which yielded 3·88 dwts. per ton, and made a profit of 1s. 8d. per ton. Eleven of the 53 producing mines returned less than 5 dwts. to the ton; only three produced more than 10 dwts. to the ton.

* * * *

Red Cross Mine Ambulance Competitions.

Three Challenge Shields have been provided for the purpose of encouraging Ambulance Work and First Aid amongst those engaged in mining work in South Africa, to be competed for annually by mining teams in the Union of South Africa and Rhodesia. (a) For surface workers or metalliferous mines, presented by the Chemical Metallurgical and Mining Society of South Africa. (Holders: Crown Mines, Ltd.) (b) For underground workers in metalliferous mines, presented by the Chemical, Metallurgical and Mining Society of South Africa. (Holders: Crown Mines, Ltd.) (c) For colliery workers (surface and underground), presented by the Transvaal Coal Owners' Association, Ltd. (Holders: Landau Colliery.) In addition, the Prevention of Accidents Committee of the Rand Mutual Assurance Co., Ltd., has kindly offered cash prizes of £25 for the winning teams in the metalliferous competitions: £10 to the winning team in the surface competition, and £15 to the winning team in the underground competition, both subject to the proviso that at least five teams compete.

* * * *

A Large Diamond.

The Amsterdam correspondent of the *American Jeweller* tells the story of an immense African diamond—weighing 457 carats in the rough —which is in process of being cut by Jaquez Metz, one of the largest diamond cutters of that City. The stone is said to have a somewhat curious history, and though its exact birthplace is only a matter of conjecture, it is known that it was found by somebody in one of the four mines of Kimberley. It is said that in June or July last year, one of the surveillance officers in the Kimberley mine found the stone, and, being exempt from search, carried it through the searching-house unperceived, and sold it to four irregular dealers for 15,000 dollars.

TOPICS OF THE WEEK.

THE COAL INDUSTRY AND THE RAILWAYS.

In stating the case for the coal industry against the railways in this column last week, we contented ourselves with giving emphasis and prominence to Mr. Dawe's speech at the Witbank meeting. His arguments were so clear and reasonable that it seemed a work of supererogation to attempt to add to them. The Railway authorities have, however, replied to them in a way peculiarly their own. They have announced that the rebate of a shilling per ton on the coal—which rebate alone made the growth of the trade to its present dimensions possible—is to be withdrawn. This is the sort of reply to take one's breath away. A more egregious form of rejoinder could hardly be imagined. It is almost impossible to conceive the point of view that prompts it. The war has sent a wave of enthusiasm through the country in favour of developing our own resources. Other Government Departments and public bodies are endeavouring throughout the length and breadth of the land to stimulate industry and to accelerate development. It is the outstanding lesson of the war, the burden of every speech, the aim of every economist. The Dominions have been encouraged to make themselves self-sufficient at once in their own interest and in that of the Empire, as a whole. In innumerable directions, fortunately, South Africa is striving to turn the opportunity to account. Only the other day a committee, misnamed the Munitions Committee—the business of which in reality is to develop all the industrial and manufacturing resources of the country—sat in the Railway Headquarters Offices, under the presidency of Sir William Hoy. That Committee is charged with a great and responsible task, and it is leaving no stone unturned to fulfil its high mission. The gold mining companies and the coal mining companies are giving their unstinted support, indeed, it will doubtless be found in the final reckoning, that they have, as usual, done the lion's share of the work. Yet the second great industry of the country is all the while allowed to languish, and by the very people who are talking loudest of advancing our industries. An industry in being is worth ten in prospect; and to ignore the one reality, while straining after the ten elusive prospects, seems the simplest form of folly. On whom exactly among the rulers of the Railways, the blame must be placed, is immaterial, and certainly no concern of ours. The Minister, the Railway Board, and the Management can be left to fight the matter out for themselves. The fact remains, that South Africa has, through a combination of circumstances, been given a unique chance to capture a good share of the coal trade of East—that trade for which it has striven for years—of the Eastern Coast of Africa, possibly even of South America; and it looks as if that chance, which may never occur again, was to be lightly thrown away. The Johannesburg Press, of every shade of opinion, has risen to the occasion splendidly; and spoken out loud and clear on what is little less than a scandal and permanent injury to the industrial future of the country. The next word rests with Parliament. When the House re-assembles at Capetown in a few days, it is to be hoped that the matter will be fully and frankly ventilated. Nothing short of a Commission of Enquiry, or failing that, a Select Committee, is requisite. The form of the enquiry does not matter. It is essential that it be soon. The future—even the very existence—of our second great industry is threatened; and if ever there was a subject for the thoughtful consideration of both Houses, this is undoubtedly one. Mr. Dawe's speech of last week, and Mr. Dale Lace's letter of this, cover most of the ground, and their arguments need not be repeated. The only new fact of the week is the Railway proposal to kill the export coal trade altogether by the withdrawal of the rebate. Clearly, the question is over-ripe for enquiry; and Parliament will be merely discharging its first and most elementary duty by attending to it at once.

GEOLOGY AND RAND MINING.

We gladly give prominence to the announcement that non-members of the Geological Society of South Africa may obtain copies of Dr. Mellor's great paper on the geology of the Far East Rand from that body for the, in the circumstances, modest sum of a sovereign. The cost of printing that paper—Mr. D. Wilkinson well described it as a classic—has been borne by the Society; and it needs no words from us to indicate the service the Society, by so doing, has rendered, not only to the Rand, but to South Africa. Had it not been for the enterprise of the Geological Society, the researches of Dr. Mellor would doubtless be still reposing in the womb of the Government Printing Department, to issue, doubtless, after the lapse of the usual lengthy interval, having lost much of their pioneering value and freshness. To what extent Dr. Mellor's paper has contributed to the present interest in the Far East Rand it is not for us to say, though it is clear that his definite and lucid views—"elusive" some of his critics would, doubtless, call them—have raised the whole discussion of Far East Rand geology to a higher plane of certainty, clarity and consistency. Second only to the service of Dr. Mellor in this matter, is the service rendered by the Geological Society, whereof there is something simply clamouring to be said. Can it be believed that at a time like this when the value of gold to the world has had unique proof and emphasis, and when the future existence of the Rand is clearly seen to depend on the ore deposits of the Far East Rand, the Government and Johannesburg Municipality have withdrawn their grants-in-aid of the Geological Society? Can it be that all the years spent in educating our rulers into the dependence of mining upon geology, and of the whole country upon mining, should have proved fruitless! It must be so, or how else can we account for this airy, off-hand treatment of a body whose sole and constant object is the study of the basic science of our great mining industry. The whole attitude of public bodies towards geology and things geological in this country gives most disheartening evidence of lack of thought and lack of knowledge. Take the chequered history of the Geological Museum. Is it not a curious and humiliating anomaly that in a town such as Johannesburg it has so far been found impossible, in spite of repeated efforts, to enlist the practical sympathy of the Municipal authorities or the Government to provide a museum, with the necessary funds to maintain it, worthy of the centre of the greatest gold mining industry in the world, and of the commercial capital of South Africa. As the Geological Society, in its last annual report pointed out: " In this, as in other matters, Johannesburg has been too modest in its claims for educational purposes. It is the centre from which, directly or indirectly, the major part of the national revenue of South Africa is derived, and yet the needs of the population in all that pertains to higher education have been ignored by the Government. It is for the community to bestir itself, and see that it is no longer behind the smaller towns of the Union which have their museums, art galleries and University Colleges, supported largely by grants of money which the Government could not give were it not for the Witwatersrand gold mining industry. The Witwatersrand ought surely to get a share of its own money for such objects." It is true that the Chairman of the Finance Committee of the Johannesburg Town Council, gave a post-prandial promise at the annual meeting of the Geological Society the other night, that the Municipal grant would be restored in June. It is a shame that it should ever have been withdrawn. People who build Town Halls at a cost of a quarter of a million, should not forget the foundations of their edifices. Nor is there anything to be said for the miserable economy represented by the withdrawal of the Government grant to the Geological Society. Scientists are proverbially meek and long suffering. When added to these defects of their attainments is the fact that some members of the Society are also Civil Servants, the gentle protests of Dr. Rogers, the past president of the Society, may be forgiven and understood. The new president, Dr. Wagner, will, we trust, make no bones about demanding, as a right, a renewal of both Government and Municipal grants. In so doing, we make bold to say, he will have the sympathy and support of the whole community.

THREE VIEWS ON THE INDUSTRY.

Extraordinarily interesting views from three different quarters regarding the position and prospects of the mining industry have been published during the week. First we have Sir Lionel Phillips, in an interview with the correspondent of *The Star*, before sailing by the Kenilworth Castle, saying that he intended to carry on the never-ending process of self-education in mining problems. He stated that it was his intention to return to England in the middle of May and he would be present at the annual meeting of the Central Mining and Investment Corporation which would probably be held in June. Rand mining, he added, bristled with problems, but there was every ground for confidence. Then, we have Mr. S. B. Joel imparting to a London interviewer some of his confidence in the future of the industry, and infusing some South African-won cheerfulness and sunshine into a dismal January day in London. "I was more than ever impressed," said Mr. Joel, "with the fact that the Far Eastern Rand is the Rand of the future. I believe that working costs will come down again after the war. There will be a considerable reduction when we get back to normal conditions. It is a curious thing to hear from South Africa," added Mr. Joel, "but the Rand is really overburdened with native labour! One of my companies has as many as 500 boys more than are required. Still, it is a good fault, and the position will be greatly eased by the restarting of the diamond mines, the temporary closing of which was largely responsible for this curious development. But the greater use of machinery in the mines has helped to bring this change. As you know, the miners' phthisis question is being tackled vigorously. Before I left the Rand I had a round-table meeting with all my mine managers and the consulting engineer, with a view to alleviating further this serious trouble. Everything that is possible will be done in order to allay it. During my visit to Kimberley the directors unanimously decided to start washing operations as from the 1st of January. That will give employment to a considerable number of men. We hope as time progresses greatly to increase the rate of working, so that when the war is over we shall be in a position to start at full swing at a moment's notice. Being a director of the three diamond mining companies, De Beers, the Premier, and the Jagersfontein, I was able to bring about a mutual understanding between these producers as to future working. With me, as must be the case with others, there appears to be no question that to work diamond mines in opposition to each other must be detrimental to the interests of all." It is to be hoped that the mutual understanding of which Mr. Joel spoke will fuse into something even more solid and permanent. Lastly, we have in the *Mining and Scientific Press*, to hand this week, some interesting opinions expressed by Mr. Hennen Jennings to no less an interviewer than Mr. T. A. Rickard, of that paper. Mr. Rickard did not fail, of course, to put a question regarding his pet subject—the life of the Rand. Unfortunately for Mr. Jennings' reputation for caution, he attempted to answer it. Though he hedged in his reply with many qualifications, he did not qualify enough. For instance, he seems to have ignored the promise of the Far East Rand altogether. Question and reply are as follows:—

> Mr. Rickard: Do you believe that the ore, that is to say, the banket containing enough gold to be profitably exploited, will persist to a uniform depth on the Rand of, say, 5,000 feet? Do you not conclude that the evidence already available indicates that the Main Reef series is becoming poorer in depth?
>
> Mr. Hennen Jennings: That, of course, is a most difficult as well as delicate question, especially as I have not been on the Rand for more than 12 years. Statistics plainly show the falling off in yield from the early to the later years, the average dropping from 42 shillings per ton in 1890 to 27 shillings in 1914. This certainly puts up danger signals, and while there is no doubt that the ore near the surface was richer than that at any considerable depth, yet selective mining was rightly and naturally done in opening up properties under adverse economical conditions. The reduction of working costs justifies the working of more and more low-grade ore, so it becomes a difficult proposition to know whether the falling off is due to impoverishment in depth or to less selective mining of the ore, or to both. The greater the number of stamps erected, the more temptation there is to work some unprofitable low-grade ore to keep them going. From the deepest shafts and bore-holes it is evident that there is some profitable ore at a depth below 5,000 feet, and before the exhaustion of the goldfield it is probable that the average working cost will be very materially reduced, and thus will allow even cheaper ore to be worked. The water in the deepest workings does not present a serious problem; pumping and winding machinery has been so perfected that in this department low cost even at great depth can be looked for. But, even as Methusaleh died, so also must the Rand, and if it survives a decreasing yield, then increasing temperatures and numbers of stamps must drive out workmen and wear down the present deposit so that in twenty or thirty years there will be little left to exploit at large profit.

We long ago abandoned the futile business of arguing with a prophet. *Qui vivra verra*; and the fact that Mr. Jennings emphasises his twelve years' absence from our midst, proves that he himself is far from regarding his opinion as final. Mr. Jennings gives an account of the introduction of the cyanide process on the Rand, which is particularly interesting. The next big event was the deep-level exploration of the banket seams, for which Mr. J. S. Curtis is given proper credit. Altogether, Mr. Rickard has secured a most interesting account of the early days of the Rand, none the less valuable and true, because it reveals one or two little human inconsistencies in the life and principles of the distinguished narrator. On the whole, there is nothing in the three interviews, from which we have quoted, to discourage or depress us. On the contrary, read in the light of recent experience, there is much therein to gratify and encourage us.

Stock Exchange Values.

In its tabulation showing the movements in the prices of representative Stock Exchange securities between November 19th and the 17th December, the last issue of the *Bankers' Magazine* shows that in 387 securities of the nominal par value of £3,424,586,000 there was a net decrease of £61,178,000, or 2·1 per cent. The main operating factor in the decline has been the removal by the Treasury and the Stock Exchange Committee, towards the end of November, of the minimum prices in Consols and some other British Government securities, with Foreign Government stocks, and Colonial and Foreign Corporation issues. Thus in nine British and Indian Funds the fall amounted to £24,089,000, or 4 per cent., 31 Foreign Government stocks declined £571,064, or 5·6 per cent., and 10 Colonial and Foreign Corporation stocks receded £735,000, or 4·9 per cent. The largest increase was £80,000, or 5·7 per cent., in eight Miscellaneous Mining shares ,followed by £57,000, or 3·7 per cent., in seven Shipping shares and £455,000, equal to 2·4 per cent., in the Financial Land, etc., shares.

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The Coal Industry.

The returns of the Department of Mines and Industries show that during the month of December there were 59 collieries producing coal in the Union, of which number 26 were in the Transvaal, and seven, five and 21 respectively in the Cape, Orange Free State and Natal Provinces. The average percentage of waste sorted to tons mined was as follows: Transvaal, 12·28; Cape, 19·16; Orange Free State, 3·94; and Natal, 25·52 per cent. Prices at the pit's mouth averaged for the Transvaal 4s. 3·94d., Cape 11s. 7·54d., Orange Free State 5s. 1·15d., and Natal 6s. 7·63d. per ton, the prices being slightly higher than during the year 1914 in the Cape Province, and a little lower in the other Provinces. The quantity of coal sold in the Transvaal during the year 1915 amounted to 5,202,805 tons, as against 5,157,268 tons for the year 1914, thus showing that the consumption by gold mines and in other ways was improving, although still in arrear as compared with the quantity sold during 1913, when the record was 5,225,036 tons.

RAND EARTH TREMORS COMMITTEE'S REPORT.

Exhaustive Review of the Subject—Historical and Descriptive—Valuable Recommendations.

THE following is the full text of the report of the Committee on Rand Earth Tremors, which consisted of Messrs. R. N. Kotze, R. T. A. Innes, and D. Wilkinson:—

1. The terms of reference to the Committee were to investigate and report upon:—

(a) the occurrence and origin of the earth tremors experienced at Johannesburg and elsewhere along the Witwatersrand;

(b) the effect of the tremors upon underground workings and on buildings and other structures on the surface;

(c) the means of preventing the tremors.

2. A notice was inserted in the *Union Gazette* and in each of the daily papers published in Johannesburg, calling attention to the appointment of the Committee, and inviting evidence bearing on the terms of reference.

3. The Committee held nine meetings for the hearing of evidence, all of which were open to the public, and the Press were present on each occasion and reported the main features of the evidence taken.

4. In the course of its investigations, the Committee examined twenty (20) witnesses, visited the Mines Department Mechanical Laboratory, where certain experiments in crushing rock and coal were carried out, and made inspections *in loco* of cracked buildings in Johannesburg, Ophirton and Pretoria. The Committee also went underground at the Village Main Reef Mine to view the effects noted there in connection with a severe shock on the 28th September, 1915.

5. The witnesses represented the views of miners, shift bosses, mine captains, mine managers, consulting engineers, surveyors, inspectors of mines, the District Engineer of the Public Works Department, various independent mining and mechanical engineers, and observers with experience of similar disturbances in other parts of the world. In addition to the 20 witnesses examined, nine persons contributed evidence by letter, but were not called. Mr. H. E. Wood, the Chief Assistant, Union Observatory, Johannesburg, supplied valuable information, and greatly assisted the Committee throughout its investigations. A list of the witnesses appears in schedule "A" attached hereto.

6. Evidence was also invited from the Master Builders' Association and the Municipal Council of Johannesburg, as to the extent of damage, if any, sustained by buildings, but these bodies were unable to supply any definite evidence.

7. The District Engineers, Public Works Department, both at Johannesburg and Pretoria, made investigations of the condition of Government buildings in each area, and greatly assisted the committee in arriving at conclusions regarding the cracks shown by various buildings.

8. In order to ascertain the extent of country over which the tremors were experienced, it was decided to distribute "Notification Post Cards." A supply of these was printed, and through the courtesy of the Deputy-Commissioner of Police, Johannesburg, the Controller of Posts, Johannesburg, and mine managers, was circulated to all police stations, post offices, and mines within an area roughly bounded by Cleveland and Maraisburg on the east and west, Eikenhof on the south, and Craighall to Waverley on the north, that is, within an approximate six-mile radius of Johannesburg Railway Station. In addition, several private observers forwarded notifications of earth tremors felt. By means of these post cards much useful information was gained as to the extent and intensity of the tremors.

HISTORICAL.

9. The subject which this Committee has been appointed to investigate was first brought into prominence on the Witwatersrand by the Ophirton Ratepayers' Vigilance Association in November, 1907, when a complaint was lodged with the Minister of Mines *re* the alleged heavy blasting under the township. At the inquiry, residents of Ophirton, who had been living there for five years, stated that they had heard blasting during the last four years, but that the first shock, which caused general alarm, and was described more as an "upheaval," occurred on Saturday, 2nd November, 1907.

10. As the result of this complaint and of subsequent reports, the Ophirton Earth Tremors Committee was appointed by Government Notice No. 650 of 1908, dated 13th July, 1908. That Committee finished its investigations and reported to the Minister of Mines on 1st December, 1908. The report of the Committee, however, was not published, but its findings were in general agreement with those of the present Committee. A copy of their report is attached hereto. (Annexure 1.)

11. In April, 1908, the Government Mining Engineer recommended the purchase and installation of two seismograph instruments for installation at the Union Observatory and at Ophirton respectively, so as to secure more precise information of the magnitude of the shocks then being experienced at Ophirton. This recommendation was supported later by the Ophirton Earth Tremors Committee. The Director of the Government Observatory, Johannesburg, had in March, 1908, made a recommendation for the installation of a seismograph at the Observatory, and as the result of these representations to the Government, the two instruments were purchased and erected in 1910. The instrument at Ophirton was in charge of officials of the Mines Department, whilst the other was taken over by the staff of the Observatory. The Ophirton seismograph was removed in April, 1913, to a new site at Boksburg, it being at that time considered conclusively proved that the magnitude of the shocks felt at Ophirton, as shown by the instrument, was too small to cause anxiety. Shocks were beginning to be felt at Boksburg, and it was considered advisable to secure records of their severity.

(A).—OCCURRENCE AND ORIGIN OF EARTH TREMORS EXPERIENCED AT JOHANNESBURG AND ALONG THE WITWATERSRAND.

Occurrence of Tremors.

12. *Terminology.*—The word "shock" would seem to be a more suitable term for the Witwatersrand occurrences than the word "tremor," and will be used throughout this report in referring to them.

13. *Localities Where Felt.*—As stated in paragraph 8, the area to which the Committee devoted particular attention since the commencement of its investigations was roughly that contained in a circle within a six-mile radius of Johannesburg Railway Station. Even this comparatively small range of country was found to be too large. Shocks have never been felt at Eagle's Nest, which is slightly under six miles south of Johannesburg Station, and it is only in exceptional instances that they are observed at Norwood—3½ miles north. The extreme points from which notifications have been received are: Forest Hill—nearly 4 miles to the south; Malvern—4 miles to the east; Langlaagte—3½ miles to the west; and Orchards and Rosebank—about 4 miles; and, in one instance, Bramley—about 6 miles to the north.

14. *Frequency of Shocks.*—Previously to the year 1907, the occurrence of shocks over the Witwatersrand was apparently rare. Between 1907 and 1910 the number of shocks experienced increased to such an extent that considerable attention was directed to the subject. Regular observations which have been carried on since July, 1910, show that the frequency of the shocks is increasing (see Schedule "B" attached). The number of shocks actually

felt and reported by persons during the last five years is as follows:—

Year July, 1910, to June, 1911	17
Year July, 1911, to June, 1912	20
Year July, 1912, to June, 1913	55
Year July, 1913, to June, 1914	88
Year July, 1914, to June, 1915	166

15. *Increasing Intensity of Shocks.*—Reports received from individual observers leave no doubt that the intensity of the shocks has been on the increase during the last five years, and this has also been confirmed by instrumental records. The twelve severest shocks recorded by the seismograph at the Observatory, in order of the date of their occurrence, are as follows:—

Date.	Amplitude on Seismograph Record. Millimetres.
1911, December 27th	3·5
1913, September 5th	7·0
1915, January 26th	3·0
1915, February 18th	5·0
1915, April 19th	5·0
1915, June 19th	12·0
1915, June 24th	8·0
1915, June 28th	5·5
1915, August 10th	5·0
1915, September 3rd	6·0
1915, September 19th	10·0
1915, September 28th	15·5

It will be seen that there is a progressive upward tendency, and it may be inferred from this that still severer shocks than any felt before are probable.

The amplitude of the record must not be confused with the amplitude of the shock. The instrument magnifies the movement very largely, and the ground probably moves only to the extent of a fraction of a millimetre (see paragraph 66).

16. *Scale of Intensities.*—For the purpose of comparing the relative violence of earthquakes, the Rossi-Forel scale is generally used. The scale is as follows:—

I. Microseismic shock; instrumentally recorded; perhaps felt by an experienced observer.
II. Extremely feeble; felt by a comparative few at rest.
III. Very feeble; felt by a considerable number at rest.
IV. Feeble; felt by persons in motion, but not generally; disturbance of certain objects.
V. Moderate; felt by every one; disturbance of furniture, etc.; quite general.
VI. Fairly strong shock; sleepers awakened; persons sufficiently startled to leave their houses; clocks stopped; oscillation of chandeliers.
VII. Strong; general panic; overthrow of movable objects.
VIII. Very strong; fall of chimneys; cracks in walls.
IX. Extremely strong; partial or total destruction of buildings.
X. Disastrous; fissures in ground, ruin and disaster.

The intensity of the most severe of the Johannesburg shocks may be put down as about "IV" or "V" of the scale, although the different character of an earthquake and a shock makes a comparison difficult.

17. *Physical Sensation of a Shock.*—The shocks as experienced in and around Johannesburg are of sufficient violence to be distinctly felt as a bodily sensation, to awaken the average sleeper, to rattle crockery and windows, and, in exceptional cases, to dislodge and break pieces of crockery. The physical sensation in the more pronounced shocks is that of a thud such as would be caused by a heavy weight falling on the ground. The occurrence of shocks is sometimes accompanied by noises which are generally referred to by observers as resembling thunder. A shock is much more noticeable in a building, and especially in a high building, than in the open air, although notifications have been received from persons who have felt a shock while playing tennis, and while in an open kiosk at the Johannesburg Zoo.

(To be continued.)

The Geological Society.

The twentieth annual general meeting of the Geological Society of South Africa was held on Monday night in the council chamber of the Chamber of Mines, Dr. A. W. Rogers presiding. The annual report of the Council drew special attention to the loss sustained by the Society in the death of Mr. Herbert Kynaston, late Director of the Geological Survey of the Union. Eight members had resigned during the year, and nineteen had been removed from the list. Only two new members had qualified. Dealing with the Society's mineral collection in Johannesburg, the report proceeded: Owing to the withdrawal towards the latter part of the year under review of the municipal grant-in-aid to the Johannesburg Museum Committee, in whose charge the Society's mineral collection has for some time been placed, it was found necessary to dispense with the services of the Museum Curator, and but for the public-spirited action of the authorities of the South African School of Mines in arranging, free of charge, to keep the museum open for the benefit of visitors and to give information to prospectors and others who use the collection, the museum would have had to be closed. The history of the museum has been a chequered one, and it is a curious and humiliating anomaly that in a town such as Johannesburg it has so far been found impossible, in spite of repeated efforts, to enlist the practical sympathy of the municipal authorities or the Government to provide a museum, with the necessary funds to maintain it, worthy of the centre of the greatest gold mining industry in the world and of the commercial capital of South Africa. In this as in other matters Johannesburg has been too modest in its claims for educational purposes. It is the centre from which, directly or indirectly, the major part of the national revenue of South Africa is derived, and yet the needs of the population in all that pertains to higher education have been ignored by the Government. It is for the community to bestir itself, and see that it is no longer behind the smaller towns of the Union which have their museums, art galleries, and university colleges, supported largely by grants of money which the Government could not give were it not for the Witwatersrand gold mining industry. The Witwatersrand ought surely to get a share of its own money for such objects. Dealing with this subject in his address, the President regretted the apathy of the town authorities and the Government. Until a suitable museum building and the funds to maintain it were available, it was impossible, he said, to lay out their collection to advantage. The paper read by the President dealt with the copper-bearing rocks of Namaqualand.

Jury and the Phthisis Board.

The trial ended this week of George Behrens, who was accused of a series of three frauds upon the Miners' Phthisis Compensation Board, and accused was found guilty upon one count—that of fraudulently obtaining £193 in the name of George Behrens, and sentenced to four months' imprisonment without hard labour. The jury brought in a strong recommendation to mercy because of the prisoner's state of health, and on account of his having been kept in custody awaiting trial for eight months. The jury also stated they considered the Phthisis Board had been very lax. Dr. Krause, who had conducted the defence, informed the Court that Behrens was in the last stage of phthisis, and was said to have only another year to live. Mr. Justice Gregorowski, before passing sentence as stated, said carelessness was not too strong a term to use in discussing the workings of the Phthisis Board. One would have thought that capable business men administering such a fund would have recognised the chance of fraud and taken precautions.

KIMBERLEY AND THE PROJECTED DIAMOND FUSION.

Future of the Industry Viewed from the Diamond Centre.

We take the following interesting comment on our recent articles on the projected diamond fusion from a leading article in the *Diamond Fields Advertiser*: "*The South African Mining Journal* foreshadows that the annual meeting of the Premier Company, to be held on February 28th, will "throw light on the projected fusion of the big diamond producers." "In financial circles," the journal continues, "the fusion seems to be regarded as the inevitable outcome of the conditions now governing the diamond industry. It is pointed out that the remarks of Mr. Gustav Imroth, who presided at the last meeting of the Premier Company, have now a special significance:—

> In connection with the future of the diamond market, I look upon the conference of diamond producers, which was held in London last June, as being of the very greatest importance. At first it seemed doubtful whether any basis of agreement could be arrived at, but subsequently two provisional agreements were entered into—one between the producers, which had for its object the elimination of the evils of competition by regulating the output and the selling price. The second agreement was as to the method of selling and it was agreed that the producers should be the principals in regard to selling, and that they should determine the prices, also that the selling agent be an agent only. Although these agreements were rendered ineffective by subsequent events, yet I cannot but think that they will form the basis of agreements which will be entered into when the diamond business is restored to normal conditions. Should this be the case, the industry will find itself in a sounder position than it has ever been in its whole history, and we can look forward to times of renewed and increased prosperity which will, to a large extent, be compensation for the period of stagnation through which we are now passing.

The *Mining Journal* goes on to say that the importance of a working agreement between the producers has never been better explained than by Sir David Harris at a meeting of the New Jagersfontein Company some years ago, when he said:—

> We must always bear in mind that diamonds, the most brilliant and beautiful of Nature's gems, are imperishable, inconsumable, and essentially an article of luxury. All this necessarily implies that as a commercial commodity diamonds are peculiarly sensitive to the financial state of the world in general, and especially of those countries from which the purchasing power is chiefly derived. These conditions make it almost imperative that the total production should be regulated and the sales controlled, so that the markets may be fed and not glutted.

The conclusion come to by the Chairman of the New Jagersfontein Company, the paper recalls, was that "when this desirable object was once achieved, the restoration of prosperity to South Africa would not be long delayed." Reference is also made to the speech of the Chairman of De Beers at the annual meeting in 1912, as to that company having, in pursuance of the policy of restricting production in order to uphold prices acquired interests in other and poorer mines, the paper adding: "Obviously from that it was but a step to the present proposal." The *Diamond Fields Advertiser* then offers the following significant comment: "We have so frequently emphasised the importance of consistently maintaining the sound principles of control and regulation of output, by which the prosperity of the industry has been developed, that it is unnecessary to do more than draw attention, as a matter of special local concern, to this presumably well-informed forecast in regard to the forthcoming annual meeting of the Premier Company, the sequel to which will naturally be awaited with keen interest. The question is a big and complicated one, no doubt, but should not be beyond the powers of those who are at the head of the industry to deal with. No greater proof of the need for conditions of production enabling effectual regulation and control, and no more convincing demonstration of the wisdom and efficacy of the policy always aimed at by De Beers Company, could have been afforded than the fact that as the outcome of the ability to withhold diamonds from the market in the absence of demand the greatest crisis in the world's history, with its unprecedented disturbance of financial and commercial conditions, has found prices still maintained. The circumstances have constituted an instructive object-lesson alike for the Government, with their practical interest, on the State's behalf, in the welfare of the industry, producers generally, and the public, for all of whom it is of equal importance that future conditions of working should be such as to prolong the life of the industry as far as possible, and conserve the prosperity from which no inconsiderable proportion of the revenue of the country is derived. It is obvious that a basis of agreement such as that indicated should among the rest be of the utmost advantage to the lower grade mines, given the practicability of arrangements for their participation in a joint scheme of control with the leading producers, while it goes without saying that any amalgamation directed to conserving the interests of the industry, and extending its period of profitable working, would operate for the material future benefit of South Africa. We often hear it asked what the position is going to be when the mines are worked out. Some people are always anticipating this remote contingency, and parading it as a bogey before the public. Naturally, they ought to cordially welcome the possibility of a scheme of combined control involving the above-mentioned prospect of a "sounder position for the industry than ever witnessed in its whole history," and "times of renewed and increasing prosperity," and it should not be too much to expect them to give any proposals to that end their hearty sympathy, and, where they may find themselves in a position to exercise any influence in the matter, practical support."

According to an article in one of the financial papers, the Alaska Gold Mines Company is going to stop increasing the tonnage sent to the mill at the expense of grade of the ore, and for a while will make tonnage secondary to a grading of the ore. By February it is hoped to have the mill running on 1.50 dol. ore. The delivery of the ore to the mill will be increased later as rapidly as the development of the mine will permit it. The experience of the Alaska Gold Mines Company, says the New York "Mining Journal," is another example of the principle that the opening of a mine so as easily to furnish 10,000 tons of ore daily is more of a job than the building of a mill to treat it.

"Safety First."

The "safety-first" movement has reached the stage of education through slogans, says the Boston *News Bureau*. Safety-first literature teems with them. The walls of workshops are covered with them. Among the following, drawn from the Inland Steel Company, and other sources, employers might select an assortment:

Keep out of debt and danger. Both are alluring, yet poor friends to make.

Peace, prosperity and good health depend on the selection and proper preparation of normal food material.

The difference between a wise man and a fool is the fool's mistakes never teach him anything.

The thinker will not drink. The drinker cannot think.

Any fool can take a chance. It takes brains to be careful.

It takes only a moment of carelessness to cause a lifetime suffering.

When hurry interferes with safety, cut out the hurry.

MINING INSTITUTE.
TEACHING CENTRES: JOHANNESBURG AND WITBANK.
Prof. YATES prepares candidates for the following Government Certificates:—
MINE MANAGER'S. MECHANICAL ENGINEER'S.
MINE OVERSEER'S. ELECTRICAL ENGINEER'S.
MINE SURVEYOR'S
by Class, Private Tuition and Correspondence.
The aggregate percentage passes for the combined classes is nearly 80 %
OVER 200 SUCCESSES.
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RECENT RESULTS FROM GOERZ MINES.

Improving Position of the Modder Deep—Progress of New Equipment—Increased Yield per Ton at the Geduld—Slightly Higher Working Costs Caused by Heavier Pumping Operations—Princess Suffers from War Charges.

A Working profit of £190,594 was earned by the Modder Deep in the three months ended December 31, 1915. The expenditure on capital account in the quarter was £10,560 13s. 3d. The summary of operations is as follows: Mined, 120,907 tons; waste sorted out (equal to 14·1 per cent.), 17,057 tons; milled, 103,950 tons; number of stamps—60, ran 77·1 days; number of tube mills—6, ran 76·24 days; sands treated, 45,200 tons; slimes treated, 59,600 tons Mine Development.—Driving, 392 feet; winzes, 235 feet; raises, 335 feet; cross-cuts, nil; total, 962 feet. For the three months ended 31st December, 1915, the footage sampled totalled 775 feet, assaying 9·8 dwts. over 47·6 inches. Dividend No. 2 of 25 per cent. (5s. per share) on the issued capital of the company, amounting to £125,000, was declared on the 15th ultimo, payable to shareholders registered in the books of the company on the 31st December, 1915. Warrants in payment of this dividend will be distributed to shareholders, who are not alien enemies, during the first week of February. The consulting engineer estimates that at the 31st December, 1915, there was developed 2,670,000 tons, having an average assay value of 8·3 dwts. over a stoping width of 73 inches. This compares with 2,450,000 tons assaying 8·0 dwts .over 69 inches at end of the previous year. The results for the quarter, when compared with the previous period, show a practical agreement in so far as grade and working costs are concerned; 950 more tons were milled, with a resultant increase in the working profit of £138 (subject to the adjustments below mentioned). It will be noted from the foregoing statement of revenue and expenditure, that certain adjustments of previous published figures have, on account of the War, been necessary in respect of realisation charges and the estimated value of gold. The work in connection with the enlargement of the plant is making satisfactory progress.

The Geduld working profit for the same quarter was £61,154. The expenditure on capital account was as follows: Shafts, underground stations, etc., £6,058 0s. 11d.; machinery and plant and buildings, £5,370 19s. 10d.; railway siding and loop line, £133 15s. 9d.; permanent surface works (dams), £6 14s. 11d.; new construction, £9,479 8s. 10d.; total, £21,049 0s. 3d. Summary of Operations.—Mined, 86,161 tons; waste sorted out (equal to 8·1 per cent.), 6,961 tons; milled, 79,400 tons; number of stamps—60, ran 86 days; number of tube mills—5, ran 89·3 days; sands treated, 31,640 tons; slimes, 47,540 tons. Mine Development, etc.—Shaft sinking: Intermediate incline, 127 feet. Development: Driving, 1,209 feet; winzes, 247 feet; raises, 1,295½ feet; cross-cuts, 134½ feet; total, 2,886 feet. For the three months ended 31st December, 1915, the footage sampled totalled 2,280 feet, assaying 9·5 dwts. over 35·2 inches. Dividend No. 3 of 5 per cent. (1s. per share) on the issued capital of the company, amounting to £48,500, was declared on the 15th ultimo, payable to shareholders registered in the books of the company on the 31st December, 1915. Warrants in payment of this dividend will be distributed to shareholders, who are not alien enemies during the first week of February. The consulting engineer estimates that at the 31st December, 1915, there was developed 2,100,000 tons, having an average assay value of 7·7 dwts. over a stoping width of 59·5 inches. This compares with 1,900,000 tons assaying 7·1 dwts .over 59·5 inches at the end of the previous year. The figures for the past three months when compared with the previous period, show that the yield per ton was higher by 2s. 0·6d. and 1,450 more tons were milled, against which working costs were increased by 1s. 2·5d. per ton, and the consequent result was a greater working profit by £4,045 (subject to the adjustments below mentioned). From the foregoing statement of revenue and expenditure, it will be noted that credit has been taken for reserve gold amounting to 4,431 fine ounces, or £18,758; also that certain adjustments of the previous published figures have, on account of the War, been necessary in respect of realisation charges and the estimated value of gold. During the month of November, a water-carrying fissure was cut in the mine, with the result that additional water had to be dealt with. The mine is now pumping about 93,000,000 gallons of water per month, and this partially explains the slightly increased working costs for the quarter.

The working profit earned by the May on the quarter was £10,145. The summary of operations is as follows: Mined, 44,470 tons; waste sorted out (equal to 5·1 per cent.), 2,270 tons; slimes treated, 15,100 tons. Dividend No. 32 of 5 days; sands treated, 23,470 tons; concentrates treated, 4,000 tons; slimes treated, 15,10 0tons. Dividend No. 32 of 5 per cent. (1s. per share) on the issued capital of the company, amounting to £14,437 10s., was declared on the 15th ult., payable to shareholders registered in the books of the company on the 31st December, 1915. Warrants in payment of this dividend will be distributed to shareholders, who are not alien enemies, during the first week of February. The figures for the quarter, when compared with the previous period, show that the yield per ton was better by 8·4d., but as the working costs were higher by 7·1d. and 790 less tons were crushed, the working profit only shows an increase of £153 (subject to the adjustments below mentioned). It will be noted from the foregoing statement of revenue and expenditure that certain adjustments of previous published figures have, on account of the War, been necessary in respect of realisation charges and the estimated value of gold.

The working profit earned by the Princess Estate in the quarter was £297. The expenditure on capital account was: Shafts, £1,491 15s. 9d.; machinry and plant, £279 7s. 3d.; total, £1,771 3s. Development.—Mine development redemption charged to working expenses, £8,675; expended on mine development, £4,638 5s. 3d.; redeemed in excess of actual expenditure, £4,036 14s. 9d. Summary of Operations.—Mined, 87,364 tons; waste sorted out (equal to 19·9 per cent.), 17,364 tons; milled, 69,400 tons; number of stamps—60, ran, 85·46 days; number of tube mills—5, ran 73·64 days; sands treated, 29,315 tons; slimes treated, 39,318 tons. Mine Development, etc.—Shaft—No. 1 Vertical.—Sump, 46 feet; pump chamber, 120 cubic feet; station works, 8,760 cubic feet. Development.—Driving, 490 feet; winzes ,27 feet; raises, 189 feet; cross-cuts, 267 feet; total, 973 feet. The footage sampled was as follows: South Reef, 380 feet, averaging 8·2 dwts. over 25 inches; Main Reef, 295 feet, averaging 7·2 dwts. over 49·7 inches. It is estimated that the payable ore (based on the milling width) developed by the above footage is: South Reef, 15,819 tons; Main Reef, 11,282 tons; total, 27,101 tons. These figures are subject to re-calculation at the end of the year when block values are made out. The figures for the past three months when compared with the previous period, show that 2,800 more tons were crushed, and the working costs were lower by 1s., but the yield per ton was down 7·7d., the net result being an increase in the working profit of £1,240 (subject to the adjustments below mentioned). It will be noted from the foregoing statement of revenue and expenditure, that certain adjustments of previous published figures have, on account of the War, been necessary in respect of realisation charges and the estimated value of gold. The increased cost of stores and other liabilities due to the War, such as allowances to the dependents of men going to the front, fall particularly heavy on this company owing to the normally small margin of profit.

JANUARY OUTPUT MAINTAINS HIGH STANDARD.

Increase of £26,999—Some Notable Changes—Improving Native Labour Position.

The Transvaal gold output for January has been declared by the Chamber of Mines to be 787,467ozs., value £3,344,948, as compared with 781,111ozs., value £3,317,948 for December, an increase of 6,356ozs., value £26,999. The January total includes gold reserves declared by the Geduld Proprietary Mines amounting to 4,431ozs., value £18,822. These reserves were placed by the company to profit and loss account as at December 31, 1915, but the announcement was made too late to enable the reserves to be included in the December output, and consequently they had to be taken into the January total. The gold actually produced in January amounted to 783,036ozs., value £3,326,126, which is 1,925ozs., value £8,177, better than the production for December. The native labour position is improving, but the total group profits show a decrease of £21,219. The official output figures for January as compared with those for December are as follows:—

Witwatersrand.

	Ozs.	£
January	759,859	3,227,646
December	755,101	3,207,464
Increase	4,751	20,182

Outside.

	Ozs.	£
January	27,615	117,302
December	26,010	110,485
Increase	1,608	6,817

Grand Total.

	Ozs.	£
January	787,467	3,344,948
December	781,111	3,317,949
Increase	6,356	26,999

Some of the mines show substantial increases for January. Among these are the Ferreira Deep with an increase of £18,996, Village Main Reef £23,761, and East Rand Proprietary £5,862. On the other hand, the New Modderfontein output for January is £10,164 below that for the previous month, while the Randfontein Central's return shows a decrease of £13,516. Two of the outside mines, the Worcester and the Rietfontein, made no return for January.

Stamp Position.

In January, 9,977 stamps were dropping on the Transvaal goldfields as against 10,025 in December, a decrease of 48. The official figures are as follows:—

	Rand.	Outside.	Total.
January	9,435	542	9,977
December	9,495	530	10,025
Decrease	60	—	48
Increase	—	12	—

Native Labour.

At the end of January the number of natives employed by the W.N.L.A. and contractors was as follows:—

Gold mines	209,835
Coal mines	9,228
Diamond mines	802
Total	219,865

For the three months the figures are:—

	Nov.	Dec.	Jan.
Gold mines ...	210,068	209,430	209,835
Coal mines ...	9,432	9,309	9,228
Dimd. mines	—	132	802
	219,500	218,879	219,865

Individual Returns.

The following are the returns of the Witwatersrand mines:—

	Ounces.	Value. £	Inc.	Dec.
Aurora West	4,145	17,607	—	679
Bantjes	5,781	24,556	573	—
Brakpan	20,965	89,054	—	110
Citya and Suburban	12,082	52,321	—	246
City Deep	29,069	123,477	—	591
Consolidated Langlaagte	15,902	67,547	—	2,409
Consolidated Main Reef	10,051	42,694	—	2,238
Crown Mines	66,091	280,737	2,761	—
Durban Roodepoort	3,362	14,281	540	—
Durban Deep	8,832	37,516	574	—
East Rand Proprietary Mines	50,673	215,245	5,862	—
Ferreira Deep	23,806	101,121	—	3,105
*Geduld	14,359	60,993	18,996	—
Geldenhuis Deep	18,462	78,422	2,995	—
Ginsberg	4,191	17,803	387	—
Glencairn	3,078	13,074	—	1,721
Government Areas	15,650	66,477	—	302
Jupiter	5,863	24,904	—	136
Knight Central	7,298	31,000	—	522
Knights Deep	20,063	85,222	—	412
Langlaagte Estates	14,336	60,895	1,457	—
Luipaardsvlei Estate	5,587	23,732	437	—
Main Reef West	6,834	29,029	964	—
May Consolidated	2,680	11,384	—	166
Meyer and Charlton	8,263	35,099	748	—
Modder B.	24,048	102,149	—	408
Modder Deep	14,992	63,682	327	—
New Goch	7,289	30,962	2.481	—
New Heriot	5,766	24,492	—	34
New Kleinfontein	16,881	71,706	1,279	—
New Modder...	25,280	107,383	—	10,164
New Primrose	3,883	16,494	—	811
New Rietfontein	—	—	—	365
New Unified	3,266	13,873	—	450
Nourse Mines	16,107	68,418	—	722
Princess Estate	6,959	29,560	297	—
Randfontein Centrals	56,977	242,023	—	13,516
Robinson Gold Mine	17,936	76,187	2,311	—
Robinson Deep	18,689	79,386	—	2.230
Roodepoort United Main Reef	8,773	37,265	—	2,188
Rose Deep	19,139	81,298	—	1,206
Simmer and Jack	17,622	74,863	140	—
Simmer Deep	12.688	53,895	—	2,583
Van Ryn Gold Mine	11,293	47,970	1,092	—
Van Ryn Deep	19,138	81,293	72	—
Village Main Reef	7,429	31.556	23,761	—
Village Deep	18,218	77,385	—	1,347
Vogel Estate	2,694	11,443	—	2,664
West Rand Centrals	462	1,962	29	—
West Rand Consolidated... ...	9.154	38,884	—	403
Witwatersrand	12,762	54,209	318	—
Witwatersrand Deep	12,614	53,581	2,583	—
Wolhuter	10,532	44.737	—	221
Miscellaneous	—	7,810	1,147	—

* Including 4,431 ozs., value £18,822, reserves.

OUTSIDE DISTRICTS.

	Ounces.	Value. £	Inc.	Dec.
Nigel	3,300	14,018	574	—
Sub-Nigel	4,034	17,135	276	—
Barrett's	252	1,066	—	246
Sheba	1,633	6,937	378	—
Worcester	—	—	—	328
Glynn's	1,713	7,277	345	—
Transvaal G.M. Estates	7,578	32.189	832	—
Quest	749	3,181	336	—
Fairview	631	2,680	—	446
Rietfontein...	—	—	—	174
Miscellaneous	—	32,759	8,188	—

Captain J. R. Leisk, secretary to the Treasury, will return shortly to South Africa. At the urgent request of the Government, Captain Leisk (now serving with General Lukin as a company commander in the 1st South African Infantry) must, states the *Pretoria News*, abandon the joys and triumphs of the trenches for the stern, monotonous daily round of duty in the Treasury. Not to put too fine a point on it, our money matters need the personal attention of the permanent head of the department, whose genius for *la haute* finance makes him as near being indispensable to the Union at the present moment as any man can hope to be.

RAND METALLURGICAL PRACTICE.—III.

Discussion of the Paper of F. L. Bosqui, presented at the San Francisco Meeting of the Chemical and Metallurgical Society, September, 1915,

THE following is the continuation of Dr. Caldecott's contribution on Mr. Bosqui's paper:—

That a good extraction from clean sand can be obtained by cyanide treatment of sand in the vat in which it is deposited from a solution-borne pulp is evident from the results with this method which is in present operation on the Rand at several mines. This fact, however, does not dispose of the point that actual recovery of the gold and not merely extraction from the ore is the true objective, and the author does not disclose how he proposes to overcome the contamination of mill service water circuit and the consequent loss of gold, resulting from alternately introducing into the same vat and saturating the filter cloth with water and cyanide solution. Roughly, the consumption of water in a Rand reduction plant is half a fluid ton per ton of ore milled, and this loss mainly occurs as moisture in sand and slime residues. In addition, however, water is consumed by mine-filling with sand residue pulp, by the periodical discharge of slime residue with mill service water, by liability to seepage and overflows at some point in its circuit, and by incidental use for many minor purposes; in general, long experience has emphasized the desirability of maintaining the mill service water as free from gold as possible, as stated by the authorities quoted above, if mysterious shortages of gold called for are to be avoided. The maintenance of free protective alkali in the form of calcium hydrate in mill service water on the Rand prevents the rapid decomposition of traces of cyanide by acid iron salts in the ore, and since sodium cyanide is capable of dissolving about twice its weight of gold, the presence of only 0·0001 per cent. of sodium cyanide in mill service water may be equivalent to over a pennyweight of dissolved gold per ton of water.

A. J. Clark, Lead, S. D.: One point I think ought to be made is this: That the establishment of the decantation process creates a large volume of low-strength solution which is successfully precipitated by zinc shavings, where zinc dust has made only a qualified success. I think this point needs emphasis, that zinc shavings would not precipitate these solutions for any length of time. New shavings are used for a very few days and then the shavings are transferred to the box in which the original solutions of the sand plant are treated. The process in Africa thus conforms to the requirements of zinc-shavings precipitation, but the zinc-dust process has to stand by itself in each instance. The zinc dust cannot be used again. It is not possible to take it from the press and use it in a stronger solution successfully. At least I have never found it so.

C. W. Merrill, San Francisco, Cal.: That is an interesting point. It shows how the process is developed according to local conditions. In Africa they have a mild climate and cheap labour, but up at the Homestake we have a very severe climate and expensive labour. We developed methods whereby we were able to handle larger bulks of pulp and still not exceed the cost factor. Local conditions will to a certain extent determine the trend of the process.

G. H. Stanley, Johannesburg, South Africa (communication to the Secretary): It might be well to emphasize the great improvement which modern results in cyaniding show in comparison with early practice as deduced, for instance, from examination of old dumps. In several cases the interiors of these have been laid open to examination as a result of sand-filling operations by hydraulicing, etc., and assays have shown the presence of thousands of tons assaying as much as 3 dwt. per ton gold in the older and bottom portions, while even the newer portions, though still made prior to tube-milling days, give assays frequently approaching 1 dwt. and in some cases considerably in excess of that figure. One dump of about 1,500,000 tons averaged 1·2 dwt., another of over 1,000,000 tons averaged 1·65 dwt., and these values have probably been reduced from the original by years of atmospheric leaching in the presence of thiocyanate in the acid dump. This high value was undoubtedly due in great measure to the coarseness of crushing which obtained, grading tests showing the presence of 35 to 45 per cent. + 60 sand particles, but at the same time a large proportion of slime is present, often in distinct layers, which prevented proper treatment of the sand and itself received practically no treatment on account of impermeability. Slime washed from the sand and assayed showed values generally about twice as high as the average of the dump. The washing was consequently very imperfect as is evidenced by the frequent presence of patches of Prussian blue colour. These points are, of course, remedied in modern practice by fine grinding to practically all through 60 mesh and by better classification, so that at present a good sand residue may assay only 0·25 dwt. Of course, the original value of the sand treated was formerly much higher than obtains at present and the extraction percentage was apparently fairly satisfactory, but that the high residue value was not due simply to the high original value is shown by the fact that a residue value which would be considered extremely good in current practice can be obtained by regrinding and re-treatment of this old residue. The re-treatment of these old residues is, however, in most cases precluded by their being covered up by later low-grade residues; by their great acidity, necessitating the use of excessive amounts of lime; and other causes. Sand dumps are regarded as a necessary evil, and give rise to much discomfort by the dissemination of dust in windy weather. Various means have been tried for preventing this, the most successful depending upon binding the particles together by spraying the outer surface of the dump with black veil mud or ore slime and salt mixed with water, both these methods being now in effective use on one or two favoured properties. There was obviously in the early days every incentive to treat with the sand as large a proportion of slime as possible, otherwise it received no treatment at all. Consequently the introduction of the decantation process by Mr. Williams constituted a great advance indeed. Before making my first personal acquaintance with the method (in 1905) I was well aware of the theoretical imperfections of the method and had busied myself with the development of a suction filter. It did not require a very long while of actual contact though to convince me that my suction-filter idea (on much the same lines as the present Moore or Butters but at that time unsupported by experience) had little chance of adoption in place of the very cheap and effective operation of the decantation plants. The margin for improvement in saving was apparently so small; and, although in the few years following much experience was gained elsewhere, only a very confident technical adviser and very strong financial interests could afford to take the respective risks involved. I am very glad that the introduction of suction filters has been so well justified. Nevertheless there seems to be no prospect of the whole of the ore being treated as one product: local feeling can be summed up in the statement that while we know slime cannot be treated like sand, we hold that sand is best treated as sand and not as slime. As with suction filtration, so with precipitation, and I am in complete agreement with Mr. Bosqui in his opinion that this is the department in which the most notable advances can and will be made. The present method has always appeared to me to be the weakest part of the whole sequence of operations and I am confident that if the same amount and quality of attention had been devoted to electrical precipitation as to zinc precipitation, a better method would have been evolved. Of the two, the zinc method appears more understandable to the practical worker deficient in scientific training and the variable factors in its operation are more or less within his ken, so that he can easily experimentally vary the conditions and ascertain those most suitable, while in the electrolytic method expert scientific knowledge and appreciation of the effects of varying factors are much more urgently required.

(*To be continued.*)

JANUARY OUTPUT: GROUP RETURNS.

Rand Mines Group.

The following are the results of crushing operations of subsidiary companies for the month of January:—

Company	No. of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton.	Total Fine Ozs.	Total Estimated Profit.
Rose Deep	300	7	67,900	17/ 8·0	19,139	£19,608
Geldenhuis Dp.	300	7	57,100	21/ 8·5	18,462	14,830
Nourse Mines	260	7	56,200	19/ 5·1	16,107	12,403
Ferreira Deep	280	7	54,180	20/ 7·2	23,806	43,029
Crown Mines	660	26	213,000	18/ 3·8	66,091	79,798
Durban Rd. D.	100	3	28,100	22/ 6·9	8,832	5,002
Tls. & averages	1900	57	476,480	19/ 3·3	152,437	£174,670

The following are the results of crushing operations of Central Mining Companies for the month of January:—

Company.	No. of Stamps Running.	Tube Mills.	Tons crushed.	Estimated Working Costs per Ton.	Total Fine Ozs.	Total Estimated Profit.
Modder B.	*96	6	45,500	16/ 7·2	24,048.	£62,243
New Modder	180	7	53,500	16/ 8·0	25,280	60,573
City Deep	†154	9	61,500	19/ 9·4	29,069	60,053
Village Deep	180	7	54,400	20/ 8·5	18,218	19,448
Village Main R.	160	4	24,150	20/ 3·1	7,429	6,420
Robinson	250	6	59,000	13/10·7	17,936	33,583
Bantjes Cons.	90	3	24,130	19/ 9·7	5,781	154
Tls. & averages	1110	42	322,180	17/11·2	127,761	£242,474

* Includes 16 Nissen stamps.

† Includes 4 Nissen stamps.

Village Deep, Ltd.—Decreased profit due to lower yield believed to be temporary, and increased costs owing to abnormal expenditure.

Village Main Reef, Ltd.—Although normal operations resumed, there were minor interruptions to hauling and plant has yet to be re-conditioned.

Bantjes Consolidated Mines, Ltd.—Development operations show more encouraging values, especially in the Leader, on which reef development is now being concentrated. The Leader drive from the Main Reef West Company show average values of 9·600 dwts. over 40 inches on the Leader alone, and 9·100 dwts. over 60 inches on the Main Reef and Leader combined for the 75 feet driven in reef.

Barnato Group.

The results of operations of the Barnato group for January are as follows:—

Mine.	Stamps.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte	100	54,800	£67,546
Ginsberg	75	15,785	17,804
Glencairn Main Reef	160	20,480	13,075
Government G.M. Areas	100	50,000	66,477
New Primrose	140	22,200	16,496
New Unified	60	13,850	14,086
Quest	55	3,526	3,241
Van Ryn Deep	80	43,900	81,294
Witwatersrand	215	43,200	54,211
January totals	965	267,741	334,230
December totals	970	266,790	338,588

Mine.	Total Working Costs.	Working Costs per Ton Milled.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte	£43,064	15·717	£25,113
Ginsberg	13,826	17·531	4,090
Glencairn Main Reef	12,513	12·220	717
Government G.M. Areas	49,986	19·994	16,896
New Primrose	13,579	12·233	3,043
New Unified	9,594	13·854	4,585
Quest	2,901	16·452	404
Van Ryn Deep	37,052	16·880	45,004
Witwatersrand	32,088	14·856	24,030
January totals	£214,613	16·031	£123,882
December totals	£214,987	16·116	£128,328

Monthly Gross Profits.—January, £123,882.

Neumann Group.

The following are particulars of the results achieved by the crushing companies of this group during last month, and officially supplied, viz.:—

	TONS.	YIELD.	PROFIT.
Witwatersrand Deep	43,600	£52,510	£16,200
Wolhuter	35,700	43,844	13,332
Consolidated Main Reef	28,330	41,840	14,253
Main Reef West	25,610	28,448	3,548
Knight Central	29,000	30,339	3,756
Total for group		£196,981	£51,089

Albu Group.

The following information is officially supplied regarding the January operations of the producing companies of this, group:—

Company.	Stamps.	Tons Crushed.	Total Cost.
Aurora West	80	15,600	£14,674
Meyer and Charlton	18 10·4	34,517	20,369
New Goch	120	30,400	21,496
Roodepoort United	80	36,087	31,778
Van Ryn Estate	140	39,000	29,229
West Rand Consolidated	100	31,900	30,054
	595	167,987	£141,379

Company.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	18/ 9·7	£17,441	£2,767
Meyer and Charlton	18/10¼4	34,517	20,369
New Goch	14/ 1·7	30,432	8,936
Roodepoort United	17/ 7·3	37,279	5,501
Van Ryn Estate	14/11·9	47,385	18,156
West Rand Consolidated	18/10·1	38,445	8,391
		£205,499	£64,120

Aurora West.—The decreased earnings are due to a purely temporary fall in grade.

Goerz Group.

Results of operations of the producing mines of this group for the month of January:—

Company	Stamps.	Tons Crushed.	Total Revenue.	Revenue per ton.
Geduld Proprietary	60	26,240	£42,522	32/5
May Consolidated	100	14,060	11,376	16/2
Modder Deep Levels	60	34,600	63,526	36/9
Princess Estate	60	23,500	29,732	25/4
Totals	280	98,400	£147,156	—

Company.	Costs. Total.	Costs. Per Ton.	Profit. Total.	Profit. Per Ton
Geduld Proprietary	£28,378	21 8	£14,144	10/9
May Consolidated	10,340	14/ 8	1,036	1/6
Modder Deep Levels ...	28,732	16/ 7	34,794	20/2
Princess Estate	20,207	24/10	525	0/6
Totals	£96,657	—	£50,499	—

Consolidated Gold Fields Group.

The following are the particulars in regard to the outputs and profits for the month of January, 1916, of the undermentioned companies of the Consolidated Gold Fields group:—

Company.	No. of Stamps.	Tube Mills.	Tons Crushed.	Gold declared. Fine Ozs.	Total Profit.
Simmer and Jack ...	320	7	66,500	17,622	£26,690
Robinson Deep	140	10	54,600	18,689	26,694
Knights Deep	400	11	111,700	20,063	16,613
Simmer Deep	220	10	65,400	13,213	4,306
Jupiter	80	5	20,600	5,648	4,511
Sub-Nigel	30	2	7,380	3,889	4,203
Totals	1,190	45	326,180	79,124	£83,026

Reserve Gold:—Simmer and Jack, 5,080 ozs.; Robinson Deep, 3,017 ozs.; Knights Deep, 3,256 ozs.; Simmer Deep nil; Jupiter, 850 ozs.; Sub-Nigel, 1,720 ozs.; total, 13,923 ozs.

The sundry revenue included in the above total declared profit is as under:—Simmer and Jack, £1,500; Robinson Deep, £725; Knights Deep, £230; Simmer Deep, £517; Jupiter, £878; Sub-Nigel, £222; total, £4,072.

Brakpan Mines.

The following information is supplied in regard to the Brakpan Mines, Ltd., January, 1916, output:—Stamps working, 140; running time, 28 days; ore crushed, 61,000 tons; tube mills working, 10; ore hoisted, 69,146 tons; ore from dump, nil; waste sorted, 12·65 per cent.; fine gold declared, 20,965·69ozs.; value declared, £88,190; equal to 28s. 10·98d. per ton milled; working costs, £57,043; equal to 18s. 8·43d. per ton milled; working profit, £31,147; equal to 10s. 2·55d. per ton milled.

T.G.M.E. January Output.

The following are the particulars of this company's output for the month of January, 1916:—Tons milled, 15,765; yielding 7,510·491 fine ounces; estimated value of month's output, £31,184; estimated profit for the month, £11,578.

Glynn's Lydenburg.

The following are the particulars of this company's output for the month of January, 1916:—Tons crushed, 4,047, yielding 1,713·764 fine ozs.; estimated value of month's output, £7,184; estimated profit for the month, £2,828.

Knight Central.

Development accomplished during January was as follows:—17th level west subsidiary shaft, south of the dyke: South Reef—Footage sampled, 85 feet; average assay value, 8·5 dwts. over an estimated stoping width of 66 inches. Main Reef, east drive—Payable footage sampled, 65 feet; average assay value, 7·6 dwts. over estimated stoping width of 72 inches. Winze from 16th to 17th on South Reef: Footage sampled, 20 feet; average assay value, 12·3 dwts. over estimated stoping width of 66 inches. East drive on Main Reef, 17th level, from auxiliary winze, 400 feet west of east shaft: Footage sampled, 45 feet; average assay value, 5·4 dwts. over estimated stoping width of 70 inches.

Zaaiplaats Tin.

The results for the month of January, 1916, were as follows:—Days run, 29; ore milled, 2,709 short tons; residues re-treated, 2,434 short tons; concentrates won, 30 long tons; average value of concentrates, 70 per cent. metallic tin; estimated loss for the month, excluding Government taxes on profits, £933 5s. 11d.; deduct adjustments in respect of estimated values of previous shipments, £804 10s. 9d.; loss declared for the month, £128 15s. 2d.; capital expenditure, nil. Note: Revenue for the month has been calculated on the basis of tin at £175 per ton.

Betsiriry Proprietary Oil Fields.

The absorption of Manambolo Oil Syndicate (Madagascar), Ltd., by this company has now been confirmed, and the capital of the company has been increased to £250,000 in 500,000 shares of 10s. each. All shareholders will receive two shares of 10s. each on surrender of each £1 share. The company's drillers, after a pleasant stay in Johannesburg, sailed for Madagascar per s.s. Bagdad, on Thursday, the 3rd February, with a full stock of drilling spares, under the charge of Mr. J. E. S. Billing, a director of the company, who will manage this company's affairs in Madagascar. Drilling should be resumed before the end of February. A prospectus for the new issue will be sent out to all shareholders.

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1915.

BY S. R. POTTER
(Editor, "S.A. Mining Journal.")

Vol. I.

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PULMONARY DISEASE AMONG AMERICAN MINERS.

THAT the inhalation of sharp particles of dust injures the mucous membrane of the lungs and in this way lessens the resistance of the lungs to pathogenic germs, especially the bacilli of pulmonary tuberculosis, has been proved by investigations of morbidity among workmen in dusty trades and by study of the prevalence of lung diseases in South Africa and other foreign countries. The matter is one of deep public concern, and attention has been called to it from time to time. Recently, with a view to affording some measure of relief through suggested educational work and through State legislation, the Bureau of Mines has undertaken, in co-operation with the Bureau of the Public Health Service, preliminary investigations of the production of dust in metal mines in various parts of the United States and the relation of the prevalence of dust to silicosis, or miner's consumption, and pulmonary tuberculosis among miners. Passed Assistant Surgeon A. J. Lanza, detailed to the Bureau of Mines, and Edwin Higgins, a mining engineer of the bureau, co-operated in making a survey of conditions in various metal-mining districts of the United States and made a report* dealing with the prevalence of tuberculosis among the miners of the Joplin district, Missouri. The following summary of conclusions and recommendations was made:—

SUMMARY OF CONCLUSIONS ARRIVED AT.

(1) The death-rate from pulmonary diseases is unusually high among the miners of the Joplin district. (2) Poor housing, exposure, alcoholism, the use of common drinking receptacles and overwork, all tend to spread infection and lessen the power of the miner to resist disease, but the prime factor in causing pulmonary trouble is the rock dust in the mines. (3) Rock dust in the sheet-ground mines, although not made in great quantity as compared to mines with more restricted working places, is harmful to the miner for two reasons—because he is exposed to it practically during his entire shift, and because the dust is made up chiefly of particles of insoluble flinty chert with splintered and knifelike edges. (4) This rock dust is produced by the blowing of dry holes, squibbing, boulder popping, drilling without water, shovelling, tramming, roof and pillar trimming, and the dumping of the bucket at the surface. (5) by observing certain precautions rock dust in the mines can be almost completely abated. (6) There are certain abuses connected with the piece system of work that demand attention and correction as far as practicable.

RECOMMENDATIONS FOR ALLAYING ROCK DUST.

(1) The following means should be employed for the abatement of rock dust in the mines: (a) Provide a water-supply for every working face by the laying of a separate water line. (b) Where drills are operated without water, attach to the hose leading to the face a 5 or 6 ft. length of pipe with a nozzle from ⅛ to ¼ in. in diameter. Make and enforce such regulations as will insure the use of this water spray for the purpose of wetting drill holes, the face, and the broken rock about the face. For the purpose of washing drill cuttings from drill holes, this hose may be attached to the long pipes now in use for blowing-out drill holes. (c) Where there is in use some type of drilling machine that provides for water passing through the core of the drill steel into the drill holes, make and enforce regulations that will insure the spraying of the face and broken rock for short periods at such times as the drill may not be in operation. For this purpose the water hose must be uncoupled from the drilling machine unless separate water connection is provided. (d) Make and strictly enforce rules against squibbing and boulder popping while the shift is underground and against the blowing of dry holes at all times. (e) Improve ventilation by the opening of new shafts whenever practicable. (2) Do away with common drinking cups and kegs, and water pipes that allow the miner to bring his lips in contact with the orifice. Substitute the well-known sanitary drinking fountain when practicable, or have miners bring their own drinking water in individual containers. (3) Do not employ as shovellers men under 20 years of age. (4) Through co-operation among the operators, stipulate a maximum daily tonnage for shovellers, so that they cannot injure their health through overwork. (5) Provide a warm, dry and clean place in which the miners may change their clothes. (6) Through intensive educational campaigns in the public schools and among the miners themselves, disseminate information as to the harmful effects of insanitary practices and conditions, such as crowded living quarters, overwork, exposure, dissipation, the breathing of air polluted by powder fumes and rock dust, and the use of common drinking devices.

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* Technical Paper 105, Bureau of Mines.

What Knights Deep Has Done.

Mr. D. Christopherson, Chairman of the Knights Deep, Ltd., in the course of his speech the other day at the presentation of a motor ambulance for service in German East, H.E. Lord Buxton formally and officially taking over the gift, referred to the generosity of the Knights Deep employes since the commencement of the war. The following details indicate what the mine has done:—Prince of Wales's Fund, £1,479 1s. 10d.; Governor-General's Fund, £407 12s.; Belgian Fund, £1,675 11s. 1d.; Knights Deep Comforts Fund, £125 2s. 3d.; Belgian Refugees Fund, £30; Hospital Ship, £19 12s. 1d.; Navy Comforts Fund, £25; Red Cross Society, £567 5s. 5d.; British Prisoners' Fund, £35 8s. 6d.; Australasian Comforts Fund, £25; Red Cross Society, £57 17s. 3d.; Two Beds, South African General Hospital, London, £50; Motor Ambulance Fund, German East, £572 10s. 7d.; Contributions from Recreation Club (to various funds), £81 1s. 10d.; Overseas Club Tobacco Fund, £38; Transvaal Scottish Fund, £16; toal, £5,433 10s. 10d.; Comforts to Red Cross Society, 17 cases; Belgian Refugees, 14 cases. The above is up to December 31, 1915.

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Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

The Coal Industry and the Railways.

To the Editor, *South African Mining Journal.*

Sir,—In a recent issue of one of your contemporaries there appeared a statement, based upon information which one of their representatives had obtained from official Railway circles with reference to the shortage of coal trucks, a matter which has received a good deal of attention in the Press recently. Unfortunately the public memory is short, or else it would remember that the complaint is recurrent and perennial. It has been so for many years past. It grew steadily worse under the C.S.A.R. regime, and has become cumulatively so since Union placed all the Railway system under one control. I am one of the oldest pioneers of coal mining in Natal and the Transvaal, and I think I may claim to speak with some authority born of personal experience on the subject of the Railway Administration's consistent failure to meet the coal industry's reasonable demands for the necessary truckage for the carrying of their coal to markets. The necessity for additional local industries has received a good deal of ventilation in public of late. With that I most heartily concur, but it is to be hoped that any new industries which may be started will receive greater consideration at the hands of the Railway Administration than the coal industry has had. If they are accorded no better treatment, it will be a poor and meagre outlook for them. It really seems that in the view of the administration any and every truckage need must be met at the expense of the coal industry. If haulage power or truckage capacity are wanted anywhere for any reason, the gap is filled by depleting the coal-haulage and truckage. In fact, this is so stated by the Railway authorities. It is apparently from their point of view quite a sufficient and legitimate reply to complaints from the collieries, to say that the accommodation is wanted elsewhere, and that as soon as the pressure is removed, the coal traffic will be facilitated. That is the stereotyped excuse. The collieries cannot have haulage, because the locomotives are working down South, or they cannot have trucks because someone else wants them.

Now, I wish to emphasise that this is a very bad state of affairs, and one which our members of Parliament should take in hand at once to seek a remedy, because years of past experience have shown us conclusively that appeals to the S.A.R. authorities result in nothing but fustian excuses and promises of amendment which are never fulfilled. The progress of the country is being retarded, as can be readily proved. The coal traffic produced in 1914 nearly 16 per cent. of the total railway revenue of the country. The figures for 1915 are not yet published, but they are probably greater. It is obvious that traffic earning such a revenue for the country is of the greatest value, and should be encouraged in every way. If the Railway revenue falls off, the deficit has to be met by the citizens in additional taxation, so that from that point alone the matter is one of common interest. But there is another point of even more serious importance. The coal companies have for a long period been making strenuous endeavours at great expense to establish an export trade Oversea, and their efforts in this direction have met with considerable success. The establishment of such a trade means additional avenues of employment, greater circulation of money, increased wealth of the country, and a greatly enhanced railway revenue. And what is the position? Steamers lie at Delagoa Bay under demurrage because the collieries cannot obtain truckage to send the coal down to fulfil their contracts. The crass ineptitude of such management is beyond palliation. We might well take a lesson from our enemies. That was not the way in which Germany built up her Oversea trade, and it requires no effort of imagination to know what would happen in that country to the General Management of a Railway Administration on the lines of ours. Even in the old Z.A.S.M. days we were better off, for then an appeal to the General Management resulted in immediate betterment. But representations made now result in promises of amendment, references to ghostly trucks and locomotives on order, and a general assurance that some day all will be right. And meanwhile the steamers sail away—and they do not return. Oversea buyers say: "Yes, your coal is good, and the price is satisfactory, but we cannot enter into a contract with you because experience has taught us that you cannot depend upon your Railway facilities for delivery at your ports." Which, of course, is true and unanswerable. The following is the position at Delagoa Bay to-day. There are now lying in that harbour, or due there to-day, steamers to load 15,100 tons of coal. To meet this there are 2,916 tons at the harbour and 4,090 tons in transit. This leaves a deficit of over 8,000 tons. At Capetown 16,500 tons are wanted. The coal on hand there and in transit is 10,067 tons, being a deficit even after all is delivered of over 6,000 tons.

All these deficits the Mines are ready and anxious to supply, but they cannot get the truckage. I am informed that to-day the truck position is worse than ever, which is a lurid comment on the assurance recently given by the Minister and Sir William Hoy that "the position would shortly improve." It is the duty of our members of Parliament, in the interests of the country, to insist that this state of affairs shall be ended.—I am, etc.,

J. DALE LACE.

Johannesburg, Feb. 4.

Red Cross Mine Ambulance Competitions.

To the Editor, *South African Mining Journal.*

Sir,—I enclose particulars regarding the Fourth Annual Mine Ambulance Competitions, to be held on the 12th, 19th, and 26th of next month. We would like, if at all possible, to see teams entered from every mine. Further particulars have been sent to each Mine Secretary and Hospital Superintendent for publication on each mine. We venture to ask that our endeavours to further efficiency in First Aid and Ambulance Work on the Mines and elsewhere will receive your sympathy, co-operation and active support, in view of its great value in saving life and alleviating pain and suffering when accidents unfortunately do occur. This branch of our work is entirely distinct from our work in connection with the war, for which we are always grateful for gifts of comforts and monetary help, particularly so as we have just been notified by the British Red Cross Society that Red Cross South Africa has to be entirely responsible for assisting the sick and wounded of all Forces, Imperial, Colonial and Indian, in the German East campaign. Thanking you in anticipation for anything you may be able to do in furthering our several objects.—I am, etc.,

FRED. ROWLAND,
Hon. Secretary.

[Particulars of the competitions appear elsewhere in this issue.—Ed.]

The Life of the Wolhuter.

To the Editor, *South African Mining Journal.*

Sir,—The question of the life of the Wolhuter often crops up, and it is quite possible that, like other outcrop mines, its career may be unexpectedly prolonged. "So long as there is ore there is life." On January 1, 1912, there were 75/80 unworked claims, carrying four reefs, with milling widths of 51ins., equal to 17ft. of ore. The dip of the reef was 65/60 degrees, giving 10,000 tons per foot of ore, or 170,000 tons of rock per claim, or 13,600,000 tons in the mine. If we cut this in two, taking half as payable, sorting, waste and ore extracted since 1912, it leaves 6,800,000 of possibly payable ore, and a life of 14 to 18 years on this basis. The pyritic reef only runs in small patches, and the Leader, South Reef and Main Reef are only payable in patches; but the ore already won per claim would give a life of 15 years on the present day reduced working costs. There are 10,000,000 tons on three Reefs only, disregarding one reef, of which two-thirds at present are payable. This works out at two-thirds of 20 or 13½ years, to my mind, and despite the official doubters, a really conservative estimate!—I am, etc.,

"VALUATOR."

[Our correspondent's estimate is interesting, but, of course, above the official estimate.—Ed. *S.A.M.J.*]

The British Trade Outlook.

A pamphlet has been issued entitled "The New Outlook in Britannic Affairs," by Ben. H. Morgan, the contents being a reprint of an address delivered by the author on December 6th, before the Bristol Branch of the Royal Colonial Institute. The necessity for stimulating our export trade is referred to, the writer suggesting that one of the first things that the Government should do is to organise and stimulate production for that purpose. He says that the business of manufacturing exporters to-day is in a chaotic condition, and cites the case of a firm employing 12,000 hands which has on its books between £300,000 and £400,000 worth of export orders which it cannot execute, because its entire resources are devoted to turning out munitions. All the leading export manufacturing firms, he suggests, could be Government controlled, as in the case of munitions firms, and excess profits could be appropriated for war purposes. The question of preference in overseas purchases is discussed, and a Britannic Commercial Union is suggested. Mr. Morgan advocates a Government policy of requiring that all our Government and public departments shall place their orders with British firms, excepting where it is "inconsistent with the public good," a wide term which opens the door to many expressions of opinion. Transportation problems are briefly referred to, as is also the need for a British Empire mark of origin. In conclusion, Mr. Morgan expresses the view that in our export commerce in future great combinations will have to be met by great combinations of our own. "Manufacturers will have to syndicate their goods, and banking houses must take a broader view of their functions, and support the enterprises of manufacturers and traders." He says that the prejudice that exists in this country against large combinations or "trusts" will not diminish unless we are guided by a strong national policy, having for its object "not only the promotion of Empire industry and trade, but the maintenance of safeguards against the improper use of the great forces which we seek to create."

* * * *

The Union's Untouched Sources of Wealth.

The intimation that has come out from Home regarding the notice which is being given to South Africa's possessions of base minerals gives promise perhaps of larger inquiries of this nature. The immediate matter of attention appears to be antimony, which is of special use in certain important branches of metal manufacture, and of which a considerable amount is known to exist in this country. But (writes the *Natal Mercury*) the material in question by no means closes the list of the metals and other mineral products which South Africa can yield, and, if not utilise itself, can contribute to the economic demand of the world outside. The metal molybdenum is one in the same category as that mentioned in a recent message. There are mica and asbestos; there are copper and tin and hematite ore. Petroleum and asphalt deposits belong at present to the more experimental fields of investigation, but something with respect to both may possibly be achieved in time. We are unable to escape the belief that South Africa's minor mineral possibilities have never properly been tested. They are of a varied character, but they need enterprise and capital to develop, both of which are rather difficult to secure as the circumstances of the Union stand at present. We shall hope to see this base metal investigation being forwarded; but our more immediate need is in the development of manufacturing industries capable of being set up on the spot in order to utilise the raw materials with which the country is so abundantly endowed. There is glass, to which we have already referred. The paper question has now been brought to the front in consequence of the policy of Sweden with regard to wood pulp, and mention of South Africa appears to have become prominent as among the sources of an alternative supply of raw paper materials. We entertain little doubt that much is to be done in that direction. Plenty of materials are available here which are suitable for paper making, more especially in the vegetable fibres which abound in the coast regions. An enterprise is already on foot, we believe, with regard to the commercial development of raffia fibre for the purpose elsewhere than in territory contained in the Union, but if, as all appearances suggest, there is going to be a world shortage of paper, we can discern very encouraging reasons why Natal's production of fibre-yielding plants in allied classes—notably, for instance, the wild aloe, which grows in profusion over almost all our coast precincts—should be taken up for practical industrial development. There are numerous possibilities of this kind out-standing. What they need is energetic, skilled, and well-financed investigation.

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* * * *

Imperial Chamber of Commerce.

The Committee of the Durban Chamber of Commerce are informed by Mr. W. M. Muir, the Chamber's representative on the Committee of the British Imperial Council of Commerce, that a business conference of that Council is to be held in London for three or four days, commencing on June 6 next. He sends a rough list of propositions suggested for discussion at the conference, and adds that the Chamber might be considering points that in its opinion should be ventilated at the conference. The following is the list of suggested propositions: That the Empire should refrain from trading with enemy firms after the war. That the British Government should impose heavy tariffs against enemy goods. That Imperial preference should be introduced with the object of rendering the Empire " self supporting." That Government contracts should be allocated to British firms as far as possible. That high tonnage dues should be applied to enemy shipping. That the compulsory registration of aliens (individuals and firms) should be introduced after the war. That the naturalisation laws should be revised. That alien firms should be prevented by law from trading in British names. That British law governing trade marks and patents should be reviewed. That the system of appointing commercial trade representatives should be investigated. That the question of railway freight on exported goods should be considered. That an inquiry should be held into the effects of shipping subsidies, rings, and conferences. That improved banking facilities should be given. That the British parcel post and telegraphic rates should be investigated, with special reference to those granted by Germany. That consideration should be given to the whole All-British Trade Mark and the Registration of Firms Bill. That the British market should be "protected" against the threatened unloading of enemy stocks after the war. That all merchandise should be distinctly and indelibly marked with the name of the country and origin; that Customs authorities should supply monthly to Chambers of Commerce returns of foreign goods imported, showing (a) country of origin; (b) general description of goods; (c) quantity; (d) name and address of importer. That the Board of Trade should be constituted a Ministry of Commerce. That the trading privileges of foreigners (enemies?) in this country should be considered. That the Diplomatic and Consular Services should be improved. That efforts should be made to remove the legislative restrictions on British traders in Allied countries. That the conditions on which enemy banks and insurance companies operate in this country should be reviewed. That bounties or subsidies should be granted to approved industries. The Committee of the Chamber will be glad either to receive in writing the views of members on points that it may be thought should be ventilated at the conference, or to call a special meeting of the Chamber to discuss those points, as the general desire may be.

Steel Corporation and the S.A.R.

The annual report of the Assistant Controller and Auditor-General (Mr. C. P. Isaac), issued last week, contains some interesting remarks regarding the relations between the Union Steel Corporation and the Railway Administration in reference to scrap taken from Pretoria in terms of the agreement of July 8, 1912. On August 31, 1914, he says, the Corporation was indebted to the Administration to the extent of £11,101 12s. for scrap. Of this, £5,068 3s. 7d. should have been paid at August 31, and the rest in monthly instalments of £650. Up to March 31 last no further scrap had been taken by the Corporation, and the amount owing to the Administration was £9,094 18s. 4d. During 1914-15 purchases of both iron and steel required by coast and inland workshops of the S.A.R. were made at the price approved by the Railway Board of 11s. per 100 lbs. The report then gives a statement showing the cost per 100 lbs. of this material at the different workshops as compared with the average cost of the same article at March 31, 1914, when the Board's minute was passed, if imported, after adding railage at ½d. per ton per mile, as recommended by the General Manager, and deducting from the local article a preference of 5 per cent. In all cases the cost of the imported article, it is shown, would be less. The comparison of cost in favour of imported iron varies from just over 2d. at Germiston and Pretoria to 3s. 8·4d. at Salt River, and in the case of steel from just over 2s. at Germiston and Pretoria to nearly 5s. at Salt River. With railage of 1·7d. per ton per mile as calculated by the Tender Board, the difference is somewhat reduced. The report goes on to point out that under Clause 4 of the agreement the Administration " sells to the Corporation the accumulation of scrap iron and steel at present lying at the Pretoria railway station and amounting approximately to 15,000 tons." Upon this Mr. Isaac remarks:—" The Corporation has purchased 16,891 tons of scrap, and from inquiries made by my officers at Pretoria it appears that this amount includes considerable quantities which were loaded up at the workshops and dispatched direct to Vereeniging so as to effect economy in handling. This scrap clearly could not have formed part of the ' accumulation of scrap iron and steel at present lying at the Pretoria railway station ' referred to in Clause 4. There is still a quantitiy of scrap lying at Pretoria railway station, but as the scrap that has accumulated since the agreement was signed has not been kept in a separate account, and as the stores records appear to be incomplete, I have been unable to ascertain what further amount of scrap the Corporation is entitled to. This point is important as any scrap purchased by the Corporation in excess of the accumulation referred to in Clause 4 should be paid for in cash against delivery in accordance with the agreement. I have requested the General Manager to inform me what further scrap the Administration considers the Corporation is entitled to under Clause 4."

Specimen copies of the *South African Mining Journal* can be had from our Agents, Argus South African Newspapers, Ltd., Byron House, 82-85, Fleet Street, London, E.C.

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THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Some Anxiety in Trade Circles—Mines Buying Steel and Electrical Material— Timber Ships Coming—White Lead Sent to Coast at 70s.—Difficulties of Anticipation.

The week opened with some excitement, not only on the Commercial Exchange, but throughout trade circles generally, owing to the torpedoing of the s.s. Author. There was at first much exaggeration as to the amount of cargo on board for Johannesburg, and although a few individual firms may be inconvenienced, yet as the cargo was of such a general character and spread over the whole country, the comparatively few lines for the Rand need not be seriously taken into consideration as affecting stocks as a whole. It was not so much the loss of a little cargo, as to what might possibly be expected to happen in the future as regards the interference with South African shipping. This disconcerting element was rather increased by the mines being pronouncedly in the market early in the week by specially requisitioning steel and electrical goods. One group alone put out orders for over £600 worth of steel, such as machine drill, tool, and every kind used for working purposes, and the constantly wearing parts, which require replacement very often. According to the best obtainable information the steel requisitioned for can be supplied out of the merchants' stocks, as the firms specialising in steel goods have foreseen something of a sudden demand coming about sooner or later. The whole crux of the position is in the freight question, and firstly comes the handling of goods in Britain, as the latest advices show that the railways are very much congested, and then after the railway is coped with, are the wharf and shipping difficulties with the added trouble of enemy interference on the journey. Therefore, it is not surprising that the mercantile community has shown some nervousness during the week. As a little set off against this nervousness a shipper in London accepted an order per cable on Wednesday for 20,000 shovels, and a similar quantity of hammers, which is an indicator that goods are obtainable in London. However, whilst one can give the recognised standard quotations here, a number of transactions go through in whispers, therefore, it is difficult to ascertain the true quotations. For example, there was a line of 6,000 insulators booked, but the price did not transpire, as the only information obtainable was that it was a special line at a special price. Nevertheless, it can be taken for granted that it was only a fraction off the recognised figure, as competition is so very keen, as a mine order with an accepted delivery note is practically equal to cash. This is the secret of the stability of the Commercial Exchange, because, if one calls back, it is very seldom the slightest whisper is heard as regards the stability of a firm, who practicaly restrict business to supplying the mines. In a conversation with a mine traveller representing a good house, it was gathered that it is difficult to obtain orders simply because the mine stores are full up. He reckons that the producing mines have from 5 to 6 months' supplies on hand, therefore, it is only in special lines the travellers are given the opportunity of quoting.

The Steel and Iron Trade.

Next to the demand for machine steel of all descriptions, the requisitions for piping required for spraying and drilling operations in the mines came next. It appears that the acids in the mine water very quickly destroy the pipes, making them like cullenders in the course of a couple of years, instead of a life of 20 to 30 years under ordinary circumstances. Stocks of iron and steel are fair, but with the constant demand it is difficult to forecast the position in the future. All the iron foundries are working full time, and in special cases overtime, to complete the work offering from the mines.

Timber and the Building Trade.

There is stil a fair demand for timber; but the mines are the best buyers, as the private house erections require less, as many jobs are in the finishing stage and only a few contracts are out to take their place. It is anticipated that Baltic timber will go a little higher, but, perhaps, not over much as a couple of timber ships are on their way from Norway to South Africa. As they are under a neutral flag and having only timber on board, it is expected they will reach our coast safely. The Oregon pine market is a difficult proposition as the American freight has risen so much that it has almost become prohibitive; however, the mines are the only real customers for that class of timber, as builders prefer paying extra for the Baltic deals as they are easier to work with less splinters of which the Oregon harder timber has a super-abundance. At the present time local stocks, are not heavy; but quite sufficient for the demand. The price of galvanised iron is up another fraction; but stocks are quite ample, and under ordinary war conditions the price at these high, almost record levels, is not expected to advance more than another half-penny or at most a penny per foot. This is the opinion of the manager of one of the largest import houses, which, to say the least, is worth having for something like a guide when tendering for contracts.

Electrical Goods.

The special demand for electrical goods during this week has caused a mild sensation throughout the trade. The idea is that the mines wish to guard against eventualities. Pure rubber flex is unobtainable, also counter weights, and key holders require a lot of searching for, and all sizes of house wire are very scarce indeed. There are plenty ot lamps, as supplies recently arrived from America. Business would be good, but the absence of lines, even in well-assorted stocks, checks the prompt execution of orders. The contractors are very slack as people have got into that condition of waiting, and nothing has to be done until the electrical apparatus stops, when workmen must be called in to do the necessary repairs. These repairs can usually be done by oddments about the workshop; but it often happens in the case of new work much delay occurs through not just having the proper material to go on with, and architects are diffident about allowing substitutes.

Oils, Paints, White Lead, Etc.

The local price of white lead is well established at 60s. per 100lb. A ton was sold on Wednesday for a coast port, which will equal, at its destination, almost 70s. per 100lb. with the Johannesburg railway carriage added. Under these circumstances it is anticipated that the Johannesburg price may soon be 70s. per 100lb., which will naturally check work being done unless it is very urgent. Turps. has risen to 51s. 6d. a case, with every prospect of being 55s. by the end of the month. With these high prices prevailing buyers are often unwittingly unfair in their remarks about the retailers reaping the extra profits. The retailer com-

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plaining says that they have more worry and trouble over their stocks, which are never advanced unless absolutely compelled because it is far better to do good business at ordinary values, rather than be in a jumpy condition which has been prevailing for a long while past, and never know what is to happen next.

THE DIFFICULTIES OF ANTICIPATION.

Merchants are in a quandary as to sending out their long-distance travellers, because of a dwindling quantity. One firm is sending out four times the goods they are receiving through the tranship details. Naturally, this cannot continue, therefore, in several cases two travellers are doing the work of three and four, owing to the uncertainty of the position, as it is only doing business harm to sell goods to arrive with only a shadow of an idea as to when that will be. However, with all the troubles and inconveniences, the money is coming in quite well throughout the wholesale houses of the town, and this in a degree is confirmed by the bank managers who state that trade bills are being paid remarkably well under the circumstances.

REVISED PRICE LIST.

Approximate war prices. subject to quick change.—Mining and building hardware: Iron, imported, bar 20s., 22s. 6d. and 25s. (local do., 15s. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 3d. lb.; drill, 5¼d. lb., tool, 7½d. to 9d. lb.; steel plates, 10ft. x 4ft. x 1-16in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 8d. per lb.; over 3 in., 7d. lb.; ½ in. up to 2½ in., 45s.; 2¼ in. to 6 in., 42s. 6d.; 6½ in. and over, 40s.; ⅝ in. up to 2½ in., 37s. 6d.; 2¾ in. to 6 in., 35s.; 6½ in. and up, 32s. 6d.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 32s. 6d.; 2¾ in. to 6 in., 30s.; 6½ in. and up, 29s. per 100 lbs. Nuts, ⅜ in., 9d. lb.; ½ in., 50s.; ⅝ in. to 1½ in., 47s. 6d.; 1⅝ in. to 1¾ in., 52s. 6d. per 100 lbs.; 2 in., 7½d. per lb.; washers, ¾ in. and under, 25s., and above that size, 22s. 6d. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £15½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s 6d. per doz.; hammers, drill, 6d. per lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 9¼d., 11ft., 9⅝d., 12ft., 9¾d.; 26 gauge, 6ft. to 10 ft., all lengths about 7d. to 7½d.; flat galvanised, 18 to 24 gauge, 30s.; 26 gauge, 31s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.; wire nails, 25s. 6d. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9x3, up to 16ft., 9¾d.; over, 10½d. to 11½d. (Oregon, 10⅛d.); flooring, 4½x⅞ and 6x⅞, 5d. to 5½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 10d. to 6s. 1d. per cub. ft.; Oregon, 4s. 6d. per cub. ft.; clear pine, ½ in. x 12 in., 7¼d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 9d. per cub. ft.; do., large, 15s. 9d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 9½d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland, 9s. 3d. per bag; 8s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.; blue, 3s.; bricks at kiln, stock, 30s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport now normal; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 25s., boiled, 25s. per 5 galls.; white lead, 60s. to 62s. 6d. per 100 lbs.; turpentine, 51s. 6d. 2/4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 21s. to 22s. 6d.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 4s. per 12½ lb. bladders, 25s. casks of 100 lbs.; grease dia. axle, 20s. per 100 lbs.; tallow, 8d. per lb.; White Rose paraffin, 13s. 4d. 2/5 petrol, 23s. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.; paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 7s. 6d. lb.; alum, 9d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay), 57s. 6d., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 14s. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 9d. per yard; 3/20 coils of wire, 27s.; do., 3/22, 23s.; tubing, 12s. to 13s. 100 ft.; keyholders, 2s. 6d. each; round blocks, 3½ in., 3s. 6d. doz., local; lamp holder cord grips, 12s. doz.; switches, 5 amp., 12s. to 13s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 18s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

PERSONAL.

Mr. H. Evelyn Haddon is on a flying visit to the Rand from London, and may be found c/o Messrs. C. L. Andersson & Co., Meischke's Buildings.

* * * *

Mr. J. H. Pridgeon, for a long time past assistant to Mr. Davis, manager of the Brakpan Mines, has been appointed manager of the Daggafontein Mine, where work has already recommenced.

* * * *

Mr. Fred Rowland, secretary of the Chemical, Metallurgical and Mining Society desires to acknowledge with very many thanks the receipt of £2 2s. received from Dr. W. A. Caldecott towards the comforts for the Royal Engineering Companies serving in France under those old Randites, Capt. Ralph Stokes and Gerard F. Williams. Further contributions would be gratefully received and acknowledged.

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THE WEEK IN THE SHAREMARKET.

Slightly Easier With Less Business—Small Priced Stocks in Demand—Excellent Outlook.

THE market has been comparatively quiet this week, and apart from a few specialities, there has been a tendency for prices to ease off. The payment of dividends has, so far, been without much direct effect, unless it be on the prices of the more speculative, small counters. Knight Centrals have continued in popular favour, and Bantjes have also been much dealt in. The January output should have a good effect, as it clearly illustrates the improving labour position. With a few notable exceptions, all the big mines are doing splendidly, and the outlook for the industry is most favourable. The question of supplies from Oversea is less acute, and there seems nothing to interrupt the smooth working of the industry at its present high standard. The question is: "Will the field be bought again on a 10 per cent. basis, over and above redemption of capital?" If so, there is certainly room for an increase in price for the majority of our shares. Of course, in many cases, it is possible to receive 20 or 30 per cent. per annum, and still get the capital sum back in a few years. In that lies the speculative attraction of the market.

	Friday. 4th.	Sat. 5th.	Mon. 7th.	Tues. 8th.	Wed. 9th.	Thurs. 10th.
African Farms	9 5	9 3	9 4	9 3	9 4	9 0*
Apex Mines	5 0*	5 0*	5 3	5 0*	5 0*	5 0*
Aurora Wests	8 6*	—	9 0*	9 3*	9 6*	10 3
Bantjes Consolidated	12 6	11 9	12 0	12 3	12 0	11 3
Brakpan Mines . . .	73 9†	70 6	70 0*	70 0*	71 0	71 0*
Breyten Collieries . .	19 0*	19 0*	—	19 0*	—	19 3*
Brick and Potteries .	—	—	—	—	—	5 0*
Bushveld Tins . . .	0 3*	0 3*	0 4	—	0 4*	0 4*
Cassel Coals	—	19 6†	—	19 6†	19 6†	—
Cinderella Cons. . .	—	4 9*	5 6*	4 9*	5 0*	5 9*
City and Suburbans	34 6*	34 6	34 3	34 6*	—	34 6*
City Deeps	73 9*	73 6*	—	72 6	73 0*	73 0
Cloverfield Mines . .	7 6	8 3	8 4	8 2	8 1	7 6*
Clydesdale Collieries	—	12 0*	—	—	—	12 0*
Con. Gold Fields . .	—	—	—	—	28 9†	—
Con. Langlaagtes . .	33 6*	34 0*	34 0†	33 6†	33 9†	33 6†
Con. Main Reefs . .	19 3*	19 3*	19 3	19 0*	19 3	19 3
Con. Mines Selection	14 3*	14 6*	14 6*	14 6	14 0*	14 0*
Coronation Collieries	25 0*	25 0*	25 6*	25 6*	25 6*	25 6*
Coronation Freeholds	0 4*	0 3*	—	0 3*	0 3*	0 3*
Coronation Syndicates	2 0*	2 0*	2 0*	—	2 3*	2 0*
Crown Diamonds . .	2 0*	2 0*	2 0*	2 0	2 0*	1 9*
Crown Mines Deb. .	—	—	£100†	£95*	£100†	£95*
Durban Rood. Deeps	—	—	15 0†	15 0†	—	—
East Rand Centrals .	3 9*	3 9*	4 0	4 2*	4 2*	4 3
East Rand Coals . .	2 8*	2 9	2 9*	2 10*	3 3	3 1
East Rand Deeps . .	1 9*	1 9*	1 9*	1 10	1 9	1 7*
East Rand Minings .	11 9*	12 6†	12 3	—	12 9	—
East Rand Props. .	18 0*	18 6	—	18 9	19 0B	19 3
E.R. Debentures . .	£77½*	£77½*	—	£77½*	£77½*	£77½*
Eastern Golds	1 6	1 9†	1 9†	1 6*	1 6*	1 7*
Frank Smith Diamds.	2 9	3 0†	2 7*	2 6*	2 6*	2 6
Geduld Props. . . .	37 0	36 9*	37 3	37 0	36 6*	36 3
Glynn's Lydenburgs.	—	—	8 0*	—	—	—
Govt. Areas	31 3	31 3	31 3	31 0	30 6	30 9
Jupiters	7 7*	8 3	8 3	8 6	8 3*	8 3†
Klerksdorp Props. .	1 8*	2 0	1 9*	1 9*	1 10	1 9*
Knight Centrals . .	16 6	16 4	18 6	—	17 10	16 6
Knights Deeps . . .	22 6†	22 6†	22 6†	—	—	—
Lace Props.	5 5	5 5	5 3*	5 6†	5 3	—
Luipaardsvlei Est. .	8 0*	8 0*	—	7 6*	7 6*	—
Lydenburg Farms . .	9 4	9 3*	9 2	8 11	8 9	8 6
Main Reef Wests . .	10 1	9 9	10 0	9 9	9 9	8 9
May Consolidated. .	—	—	8 0*	—	—	—
Meyer & Charltons .	97 6*	97 6*	100 0*	101 3†	100 0*	100 0*
Middelvlei Estates .	1 5	1 4*	1 4*	1 4*	1 4*	—
Modder B.'s.	117 0*	118 6†	118 6†	118 0†	118 0†	115 0*
Modder Deeps . . .	—	118 0	116 6*	116 0*	116 0*	—
New Boksburgs . . .	—	—	1 3*	1 6*	2 0	—
New Eland Diamonds	14 0†	14 0†	14 0†	14 0†	14 0†	14 0†
New Era Cons. . . .	7 4*	7 6*	7 6	—	7 9	7 7*
New Geduld Deeps .	3 7	3 7*	3 9	3 9*	3 9	3 8*
New Gochs	—	11 6*	—	13 0†	—	—
New Heriots	55 0†	—	55 0†	52 6*	53 0*	54 0*
New Kleinfonteins .	28 9*	29 0	29 3	29 0	28 9	28 3
New Modders. . . .	—	305 0A	307 6†	303 9A	302 6*	305 0*
New Rietfonteins . .	0 3*	0 4*	0 9	—	1 0†	—
New Unifieds	11 0*	11 6*	13 0†	13 0†	13 0†	13 0†
Nigels	—	6 0*	—	7 0*	7 0*	7 0*
Nourse Mines	—	—	—	15 0†	—	10 0*
Pretoria Cements . .	58 0*	60 0	61 0*	62 0	60 0	59 6
Princess Estates . . .	3 9*		4 0	3 9	3 6*	3 9†
Rand Collieries . . .	3 0*	3 6*	3 3*	—	3 3*	—
Rand Klips	6 6*	6 6	6 7	6 4	6 8	6 6
Rand Mines	—	—	87 6†	—	—	
Rand Nucleus	2 0	1 11*	1 11*	1 11*	2 0	1 9*
Randfontein Deeps .	3 3	—	3 3*	3 4*	3 6*	3 6*
Randfontein Estates .	—	—	—	—	11 6	11 0*
Roberts Victors . . .	—	—	10 9†	10 0*	10 0*	10 3*
Rooibergs	11 6*	11 9*	11 9*	11 6†	10 6	10 9*
Roodepoort Uniteds .	7 6	8 0*	8 3*	8 3*	8 6	8 3A
Ryan Nigels	2 3*	—	2 0*	—	—	3 6†
Shebas	1 6	1 3*	1 3*	1 6	1 6*	1 9*
Simmer Deeps . . .	2 0*	2 3*	2 7*	2 0A	2 6	—
S.A. Breweries	—	—	—	30 0†	—	—
S.A. Lands	4 2	4 0	4 1	3 11*	4 0	3 9*
Springs Mines . . .	41 0	43 0	43 0	43 6	42 6*	42 0*
Sub Nigels	11 6*	—	11 3*	11 3*	11 6	12 0†
Trans. Coal Trusts .	52 0*	53 0	52 0*	53 6	53 0*	53 0*
Transvaal Lands . .	12 6*	12 6†	13 0*	14 6	14 0*	13 0*
Trans. G.M. Estates.	27 0†	25 0*	27 0†	27 0†	26 0B	23 6*
Tudors	—	2 0†	2 0†	—	—	—
Van Dyks	—	—	3 9†	3 6†*	3 3†	2 6*
Van Ryn Deeps . . .	60 0	59 6*	60 0†	59 0*	59 3	58 6*
Van Ryn Estates .	—	—	—	—	45 0*	45 0*
Village Deeps . . .	—	33 0*	33 3*	33 6*	34 0†	—
Vogel Con. Deeps . .	1 10	1 11	1 9*	1 9*	1 10*	1 9
Welgedachts	—	22 0†	19 0*	20 0*	21 0*	20 0*
West Rand Estates .	8 6*	—	—	—	—	—
Western Rand Est.	1 6†	1 0*	1 0*	1 0*	1 6†	1 4†
Witbank Collieries .	40 0*	—	40 0*	40 0*	43 0†	—
Witwatersrands . . .	53 0*	53 0*	53 6†	53 6†	53 6†	53 6†
Wit. Deeps	24 9	25 0	25 0	25 6	24 0*	24 0†
Wolhuters	10 7	11 0†	10 3	10 6*	10 3*	10 3*
Zaaiplaats Tins . . .	10 6	10 3*	10 0	10 3	10 3*	10 3

* Buyers. † Sellers. A Odd lots.

ANSWERS TO CORRESPONDENTS.

All inquiries addressed to the Editor must bear the writer's name and full address. We cannot reply to inquiries by letter, but telegrams with replies prepaid will be answered. Correspondents are requested to write their names and pseudonyms distinctly.

"Springite."—There appears to be no truth in the rumour. No such deal could be effected under the Gold Law, as it exists at present. The township belongs to the Coal Trust.

"Star" (Benoni).—Copy of the issue giving the history of the venture has been posted to you.

"Hopeful."—Can obtain no information. Unlikely that a move will be made till the war is over.

"A.H.S." (Germiston).—Beyond the cable printed, no particulars are as yet available on this side regarding the Daggfontein reconstruction.

"Shareholder" (Capetown).—Your suggestions have been noted, and will certainly be embodied in the next issue of the work.

"Koffy" (Kimberley).—It is true that one of the new directors is a member of the De Beers board, and the other a member of the New Jagersfontein board. Your inference is correct.

"C.K.S."—If *Truth* says that East Rands are not worth intrinsically more than 10s. the onus is on that paper to justify its opinion. We never said anything of the kind, and you have been misinformed.

"Signaller" (Potchefstroom).—Drumkey's *Year Book for East Africa* is, obviously, the book you want. Any bookseller will order it for you, or you can get it at Mombasa. Sir Charles Eliott's *The East African Protectorate* will also help.

Engineering Notes and News.

The Pressure System of Mine Ventilation.

At the Copper Queen mine, Bisbee, Arizona, the Spray, Gardner, Lowell and Sacramento divisions are ventilated entirely by mechanical means. After the pressure and exhaust systems of ventilation were carefully studied, according to Mr. Charles A. Mitke, in a paper prepared for the A.I.M.E., the former method was adopted. In this system all mine fans were placed underground on the deepest working levels of the different divisions so as to draw the air down the intake shafts, force it through the workings and stopes, and exhaust it to the surface through upcast shafts. The reasons for adopting the pressure instead of the exhaust system are as follows:—(1) More practical. Since all the deep shafts of the Copper Queen are in operation and a large amount of work is done around each, as, for example, men going on and coming off shift, handling timber, tools and supplies, etc., it would not be practical to have an exhaust fan on the surface near the collar of the shaft. In the Gardner a subway below the collar of the shaft would be out of the question. Consequently, a large air-tight chamber, inclosing nearly the entire head-frame, would have to be built if a suction fan were used. (2) Better control of mine fires. The pressure system is the more advantageous in case of mine fires. With this arrangement the entire workings are under pressure, and the gas or smoke from a mine fire may be coursed to exit through neighbouring shafts that are not in operation. Since the air is under considerable pressure at the bottom and sides of the present fire districts and each of the outlets over them is provided with regulator doors, the quantity of air passing through the fire zone can be increased or diminished at will, and consequently the fire can be brought under control more readily than with the exhaust system. (3) Greater efficiency. Since the Spray, Gardner, Dallas and Sacramento shafts are natural downcasts, the mine fans were placed underground so as to take advantage of these circumstances and multiply the volume of the natural downcast from five to ten times. The pressure system, therefore, has the advantage of the additional natural ventilation, which evidently would be lost with the other system; and more power would be required for the same quantity of air if the natural downcasts were changed to up-casts by suction fans. (4) Greater safety. Experience in the Lowell mine fire showed that in in the event of the connections being closed between the fire and the suction fan there is a possibility of smoke and gases entering the workings below and endangering the men. In the adopted system the maximum air pressure is below the fire district, which makes it impossible for gases to go down, even if bulkheads of a sealed fire district should be opened suddenly by caving ground. At present a churn-drill hole is being put down to a depth of 1,100 ft. over the old Lowell fire stopes. When this is completed water will be run in to cool the area. No trouble is anticipated, since this was thoroughly tried at the Holbrook, where a large amount of water was turned into churn-drill holes, and no smoke or gases were taken down against the pressure of the mine fan. The advantages of the new ventilating system are summarised as follows:—(1) A smaller quantity of compressed air is used for ventilation. (2) All possible natural ventilation is utilised, and the general direction of air currents is the same for both natural and mechanical ventilation. (3) There is a decrease in temperature and a lower percentage of humidity and CO_2 throughout the mine, which means healthier working conditions. (4) A saving of eight 5-h.p. blowers was made, as these have been removed from the mine. (5) The five lower divisions are under pressure, which partly acts as a check in preventing some mine fires from crossing the Copper Queen side-lines, as, for example, the proximity of one mine fire near the Gardner workings. (6) Less decay of mine timbers. (7) The volume of air has been increased from 60 to about 300 cubic feet of air per man per minute. (8) Formerly a large amount of moisture kept the timbers and working places in a damp condition, and fungus also covered most of the timbers. Since the mine fans were started a large amount of water is removed daily from each division by the air currents, so that the mine is comparatively dry and the growth has disappeared. (9) The increase in velocity and volume of air resulted in the greater efficiency of the men. And (10)the new ventilating system is advantageous to the mines adjacent to the Copper Queen; there is a great deal of broken and stoped ground along side-lines, permitting a large amount of air to escape through these avenues and ventilated stopes beyond the Copper Queen boundary.

Premier Preference Dividend.

The Premier (Transvaal) Diamond Mining Company, Ltd., has declared a dividend of 6s. 3d. (six shillings and threepence) a share on the Preference Shares of the company. The dividend is the preferential dividend accumulated on the preference shares in respect of the period from 1st May, 1914, to 31st October, 1914, and will be paid to all preference shareholders registered at the close of business on the 14th day of February, 1916.

"SKEFKO"

BALL BEARINGS.

'Phone 835. Johannesburg. Box 654.

Premier (Transvaal) Diamond Mining

Company, Limited.

(Incorporated in the Transvaal.)

DIVIDEND No. 20. PREFERENCE SHARES.

NOTICE IS HEREBY GIVEN that the Premier (Transvaal) Diamond Mining Company, Limited, has declared a dividend of 6s. 3d. (Six Shillings and Threepence) a share on the Preference Shares of the Company.

This dividend is the preferential dividend accumulated on the Preference Shares in respect of the period from 1st May, 1914, to 31st October, 1914, and will be paid to all Preference Shareholders registered at the close of business on the 14th day of February, 1916.

Warrants in payment of the dividend will be issued to South African Shareholders from the Head Office of the Company, Cullinan Buildings, Simmonds Street, Johannesburg, as soon as the necessary returns have been received from the London Branch Office.

Coupon No. 20 in respect of the dividend on Bearer Warrants will be paid at the same time as the Dividend Warrants are issued, and must be deposited with the Company on and after the 15th March, 1916, for examination.

By Order of the Board,
W. M. CHALMERS,
Assistant Secretary.

Head Office: 4th Floor, Cullinan Buildings,
Simmonds Street, Johannesburg,
4th February, 1916.

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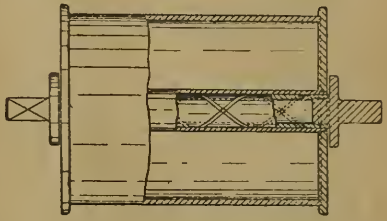

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11-17, Trust Buildings,
Fox Street, Johannesburg.

The Langlaagte Estate and Gold Mining Company, LIMITED.

(Incorporated in the Transvaal.)

DIRECTORS' REPORT

For the year ended 31st December, 1915.

Submitted at the Twenty-fifth Ordinary General Meeting of Shareholders held on the 31st January, 1916, in the Board Room, Mayfair, Johannesburg.

To the Shareholders,
THE LANGLAAGTE ESTATE AND GOLD MINING CO., LTD.

Gentlemen,—Your Directors beg to submit their Twenty-fifth Annual Report and Audited Accounts of the Company, together with the Manager's Report, for the year ended 31st December, 1915.

CAPITAL.

The Capital of the Company is £950,000 in shares of £1, of which 886,500 are issued and 63,500 held in reserve.

PROPERTY.

Remains unaltered.

OPERATIONS.

During the year 200 Stamps and Tube Mills ran 337.729 days, crushing 612,297 tons of ore, which yielded 167.599.380 ounces of Fine Gold, in value, together with Sundry Revenue, £710,214 19s. 8d., equal to 23/2.38 per ton milled. The cost of Production was £531.793 13s. 10d., or 17/4.45 per ton milled, and the cost of treating Accumulated Slimes was £13.684 17s. 4d., or 5.36d. per ton milled, total £545,478 11s. 2d., equal to 17/9.81 per ton milled. The balance was £164.736 8s. 6d., equal to 5/4.57 per ton milled. Working Costs were reduced by 2.26d. per ton, but as there was a drop in Revenue of 1s. 1.35d. per ton (due to the Accumulated Slimes, which were finished in October, yielding £42,245 less than last year), the profit shows a decrease of 11.09d. per ton, equal to £21.118. There was an increase of 22,678 tons in the quantity milled.

FINANCIAL.

By Balance at 31st December, 1914	£40,384	13	9
,, Balance of Expenditure and Revenue Account	164,736	8	6
,, Dividends received	141	16	8
	£205,262	18	11

APPROPRIATION.

To Dividend No. 50 of 7½%, declared June, 1915	£66,487 10 0					
,, Dividend No. 51 of 7½%, declared December, 1915	66,487 10 0					
		£132,975	0	0		
,, Capital Expenditure for the year		18,628	5	4		
,, Profits Tax and Special Levy...		18,095	4	0		
,, Licences, Rates, Taxes and Audit Fees		6,506	8	0		
,, Contributions to Miners' Phthisis Act and to Phthisis Sanatorium		10,023	13	10		
,, Rent of Bewaarplaatsen leased from Government...		4,690	0	0		
,, South African Income Tax. . . .		233	0	0		
,, Reserve to meet War Charges on Gold for year ended 30th September, 1915..		6,952	10	0		
,, Sundries		357	18	4		
,, Balance to Balance Sheet		6,800	19	5		
					£205,262	18 11

DIVIDENDS.

The declaration of Dividends Nos. 50 and 51 of 7½% each in June and December (total £132,975) is submitted for confirmation.

ORE RESERVES.

The estimated Ore Reserves in Block B. Mine at 31st December, 1915, amounted to 1.905,280 tons, as follows:—

Payable.—Main Reef, 440,841 tons, valued at 6.37 dwts. over stoping width of 54 inches; South Reef, 720,278 tons, valued at 5.90 dwts. over stoping width of 48 inches; making a total of 1,161,119 tons, valued at 6.08 dwts. over stoping width of 50 inches.

Unpayable.—551,791 tons, valued at 2.49 dwts.

Unclassified (probably payable).—192,370 tons.

The increase in payable reserves amounts to 274.723 tons of 0.11 dwt. better value.

DEVELOPMENT.

14,195 linear feet and 61,145 cubic feet were driven, risen and sunk, being an improvement of 1,398 and 15,240 feet respectively.

GOLD REALISATION.

Since the 1st October our Gold has been taken into account at 83/2d. per fine ounce only, instead of 84/- as in the past. This is to allow for War Charges, chiefly war-risk insurance. Provision amounting to £6.952 10s. has been made for these War Charges for the year ended 30th September, 1915.

MACHINERY AND PLANT.

Machinery and Plant is maintained in good order.

DIRECTORS.

In terms of the Articles of Association, Mr. Jas. H. Crosby retires from office, but, being eligible, offers himself for re-election.

AUDITORS.

Your Auditors, Mr. S. Fleischer and Messrs. C. L. Andersson and Co., retire from office, but seek re-election. You will be asked to appoint Auditors for the ensuing year, and to vote their remuneration for the past Audit.

JAS. H. CROSBY,
N. J. SCHOLTZ,
Directors.

The Langlaagte Estate and Gold Mining Company, Limited.—continued.

BALANCE SHEET AS AT 31st DECEMBER, 1915.

Dr.		
To Capital	£950,000 0 0	
Less Reserve Shares	63,500 0 0	
		£886,500 0 0
,, Share Premium ...		80,500 0 0
,, Funds Transferred from Appropriation Account—		1,000,084 11 8
For Expenditure on Property, Development, Equipment, etc., in excess of Working Capital provided—		
As at December 31, 1914 ...	981,456 6 4	
Plus Capital Expenditure, 1915	18,628 5 4	
		1.967,084 11 8
,, Dividend No. 51, declared December, 1915 ...		66,487 10 0
,, Union Government Profits Tax and Special Levy for year 1915		17,500 0 0
,, Sundry Creditors, etc. ...		43,744 10 1
,, Balance of Appropriation Account Unappropriated ...		6,800 19 5
Contingent Liabilities.		
1,503 Witwatersrand Co-operative Smelting Works shares at 12s.	£901 16 0	
952 Witwatersrand Native Labour Association shares at 8s....	380 16 0	
	£1,282 12 0	
		£2,101,617 11 2

Cr.	
By Property ...	£1,015,333 9 7
,, Development, Shafts, etc.	294,171 8 11
,, Machinery and Plant ...	615,256 13 6
,, Roads and Fences ...	1,333 4 3
,, Buildings ...	38,474 17 5
,, Shares ...	2,514 18 0
	£1,967,084 11 8
,, Furniture ...	2,224 2 2
,, Livestock and Vehicles ...	1,526 10 0
,, Stores on hand ...	35,388 6 3
,, Stores in Transit ...	3,907 10 8
,, Sundry Debtors and Payments in Advance ...	7,762 9 1
,, Cash in Bank and Unrealised Gold	83,724 1 4
	£2,101,617 11 2

STATEMENT OF EXPENDITURE AND REVENUE ACCOUNT for the Year ended 31st DECEMBER, 1915.

To Development ...	£32,412 9 0
,, Mining ...	255,423 9 5
,, Hauling and Pumping ...	78,798 5 1
,, Sorting ...	1,093 2 1
,, Crushing ...	5,470 0 1
,, Transport ...	17,318 19 8
,, Milling ...	61,173 1 8
,, Water Service ...	8,373 10 7
,, Cyaniding ...	66,439 5 11
,, General Expenses—Mine ...	13,246 9 8
,, General Expenses—Head Office, etc.	5,729 18 0
,, Balance to Appropriation Account	164,736 8 6
	£710,214 19 8

By Gold Account ...		£700,905 19 5
Mill ...	£359,503 8 6	
Cyanide ...	341,402 10 11	
,, Sundry Revenue ...		9,309 0 3
		£710,214 19 8

APPROPRIATION ACCOUNT.

To Dividends ...		£132,975 0 0
No. 50 at 7½ per cent. declared 30th June, 1915 ...	£66,487 10 0	
No. 51 at 7½ per cent. declared 31st December, 1915 ...	66,487 10 0	
,, Capital Expenditure for year 1915		18,628 5 4
,, Profits Tax and Special Levy ...		18,095 4 0
For Year 1915:—		
Profits Tax ...	11,000 0 0	
Special Levy ...	6,500 0 0	
Under-estimated, 1914 ...	595 4 0	
,, Licences, Rates, Taxes, and Audit Fees ...		6,506 8 0
,, Contributions under Miners' Phthisis Act and to Phthisis Sanatorium ...		10,023 13 10
,, Rent of Bewaarplaatsen leased from Government ...		4,690 0 0
,, South African Income Tax ...		233 0 0
,, Sundries ...		357 18 4
,, Reserve to meet War Charges on Gold for year ended 30th September, 1915 ...		6,952 10 0
,, Balance to Balance Sheet ...		6,800 19 5
		£205,262 18 11

By Balance at 31st December, 1914 ...	£40,384 13 9
,, Balance of Expenditure and Revenue Account ...	164,736 8 6
,, Dividends Received ...	141 16 8
	£205,262 18 11

J. C. K. POLLOCK, Secretary.

JAS. H. CROSBY,
N. J. SCHOLTZ,
Directors.

We have audited the Balance Sheet of the Langlaagte Estate and Gold Mining Company, Limited, dated the 31st day of December, 1915, above set forth, and have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the Company's affairs according to the best of our information and the explanations given us and as shown by the Books of the Company.

S. FLEISCHER,
C. L. ANDERSSON & CO.,
Incorporated Accountants (Eng.),
Auditors.

The Randfontein Estates Gold Mining Company,

WITWATERSRAND, LIMITED.

(Incorporated in the Transvaal.)

DIRECTORS' REPORT

For the year ended 31st December, 1915.

Submitted at the Twenty-third Ordinary General Meeting of Shareholders, held on the 31st January, 1916, in the Board Room, Mayfair, Johannesburg.

To the Shareholders,
THE RANDFONTEIN ESTATES G.M. CO., WITWATERSRAND, LTD.

Gentlemen,—Your Directors beg to submit their Twenty-third Annual Report and Audited Accounts of the Company for the year ended 31st December, 1915, also the Report of the Manager of the Power Station for the same period.

CAPITAL.

The Capital of the Company remains at £3,001,548 in shares of £1 each all issued.

PROPERTY.

The property held by the Company consists of :—

FARMS.

	Acres.
Randfontein Proclaimed Freehold Farm	5,746
Uitvalfontein	3,247
Waterval	6,018
Rietfontein, Unproclaimed Freehold Farm	728
Droogeheuvel	2,457
Middelvlei	2,718
Gemsbokfontein	1,423
Panvlakte	3,389
Total	31,726

MYNPACHTS.

	Acres.
No. 400 Randfontein	275
,, 401 ,, ...	294
,, 408 Uitvalfontein	212
,, 434 ,, ...	205
,, 438 ,, ...	112
,, 452 Waterval	422
,, 453 ,, ...	178

The above Mynpachts have been leased to The Randfontein Central G.M. Co., Ltd., except the following, which are available for future flotation :—

No. 401, Randfontein, portion equal to 142 acres.
No. 453, Waterval, equal to 178 acres.

MINING CLAIMS.

1,209 Prospecting Claims on farm Randfontein.
2 Diggers' Claims on farm Randfontein.
44 Prospecting Claims on farm Uitvalfontein.
442 Prospecting Claims on farm Waterval.

1,697 Claims available for future flotation.

BEWAARPLAATSEN.

9 on farm Randfontein.
9 on farm Uitvalfontein.

18 Bewaarplaatsen.

MACHINE STANDS.

4 on farm Randfontein.
4 on farm Uitvalfontein.

8 Machine Stands.

DEBENTURES AND SHAREHOLDING.

Debentures and Shares in Subsidiary and other Companies valued at £7,869,891 0s. 8d. There was a decrease of £86,400, by which amount the holding of Randfontein Central Debentures was reduced owing to the receipt of the Redemption instalment due 1st March, 1915, and increases (1) of £150,000 for 150,000 Central Reserve Shares taken up at par in March, to strengthen that company's position firmly as regards Development; (2) of £4 10s. adjustments.

TOWNSHIP.

On farm Randfontein, held under Government title.

OTHER ASSETS.

Comprising Machinery and Plant, Buildings, etc., are set forth in the Balance Sheet of the Company, presented herewith.

FINANCIAL.

The following is the financial position of the Company :—

By Balance as at December 31st, 1914	£361,440	0	3	
,, Balance of Expenditure and Revenue Account, 1915	280,235	1	6	
,, Redemption of Randfontein Central G.M. Co. Debentures ...	86,400	0	0	
,, Discount on Debentures purchased for redemption on 1st March, 1915	6,510	12	7	
				£734,585 14 4

APPROPRIATION.

To Dividend No. 4 of 2½% declared June, 1915	£75,038	14	0	
,, Debenture Interest paid out ...	113,073	12	0	
,, Debenture Redemption	57,600	0	0	
,, Capital Expenditure	162,184	9	11	
,, Rates, Taxes, Licences and Audit Fees	5,802	0	2	
,, South African Income Tax... ...	190	0	8	
,, Sundries	568	16	8	
,, Balance to Balance Sheet	320,128	0	11	
				£734,585 14 4

SUBSIDIARY COMPANY.

THE RANDFONTEIN CENTRAL GOLD MINING COMPANY, LIMITED.

Capital.—£4,500,000 in 4,500,000 Shares of £1 each, of which 156,300 are held in reserve.

Operations.—905 Stamps and Tube Mills ran 293 days and crushed 2,466,520 tons of ore, which yielded 680,716 ounces of Fine Gold, in value, together with Sundry Revenue, £2,857,877 2s. 2d., equal to 23/2.08 per ton milled.

The floods which had to be contended with in the early part of the year at great expense, and the influence of War prices on cost of material and realisation charges on Gold, account for the poorer results. Steps are being taken to meet the position by temporarily curtailing tonnage by utilising the full capacity of the modern Central Mill and closing down three of the four small Mills.

DIVIDENDS.

You are asked to confirm the declaration of Dividend No. 4 of 2½% for the year. This was paid to Shareholders registered on the 30th June, 1915.

DIRECTORS.

In terms of the Articles of Association, Mr. Jas. H. Crosby retires from office, but, being eligible, offers himself for re-election.

AUDITORS.

Your Auditors, Messrs. C. L. Andersson and Co. and Mr. S. Fleischer, retire from office and seek re-appointment. You will be asked to appoint Auditors for the ensuing year, and to vote their remuneration for the past audit.

JAS. H. CROSBY,
N. J. SCHOLTZ,
Directors.

The Randfontein Estates Gold Mining Company, Witwatersrand, Limited.—continued.

BALANCE SHEET AS AT 31st DECEMBER, 1915.

Dr.			
To Capital			£3,001,548 0 0
,, Share Premium			2,257,849 9 3
,, 6 per cent. Debentures			1,884,560 0 0
Issued		£2,000,000 0 0	
Less Converted into shares		3,440 0 0	
		£1,996,560 0 0	
Less 1st and 2nd instalments of Redemption		112,000 0 0	
,, Reserve for Depreciation			2,955,010 8 6
Being Funds Transferred from Appropriation Account since inception of Company for Expenditure in excess of Working Capital provided, for investments in shares of Subsidiary Company, Debentures, Machinery and Plant, Property, etc. :—			
As at 31st December, 1914...		£2,821,625 18 7	
Plus Capital Expenditure, 1915 .		162,184 9 11	
		2,983,810 8 6	
Less difference between receipt for Redemption of Debentures held ...	£86,400 0 0		
And Payment for Redemption of Debentures issued ...	57,600 0 0	28,800 0 0	
,, Trustees for £2,000,000 Debenture Holders			97,500 0 0
,, Sundry Creditors			109,563 8 11
,, Balance of Appropriation Account Unappropriated			320,128 0 11
Contingent Liabilities.			
2 Witwatersrand Native Labour Association shares at 8s.		£0 16 0	
			£10,626,159 7 7

Cr.	
By Property	£1,757,733 3 2
,, Central Power Station and Electrical Plant	543,359 14 2
,, Machinery and Plant	28,198 11 9
,, Buildings	23,018 18 6
,, Prospecting	40,327 18 5
,, Township	12,439 18 2
,, Dams and Reservoirs	29,811 18 9
,, Plantations, Roads and Fences ...	14,149 17 4
,, Shares	4,971,604 0 8
This Company has an option over 156,300 Randfontein Central Reserve Shares at par for 2 years, expiring 8th March, 1917.	
,, Debentures	2,898,287 0 0
,, Debenture Redemption Account..	97,500 0 0
,, Livestock and Vehicles	1,973 0 0
,, Furniture and Stores	21,401 13 9
,, £61,100 Debentures purchased for Redemption on 1st March, 1916...	53,256 14 6
,, Sundry Debtors and Cash in Bank	133,096 18 5
	£10,626,159 7 7

STATEMENT OF EXPENDITURE AND REVENUE ACCOUNT for the Year ended 31st DECEMBER, 1915.

To General Expenses—Estates		£1,184 4 3
,, General Expenses—Head Office, etc.		8,832 13 4
Salaries, Directors Fees, Legal Expenses, Cables, Stationery, Printing and Advertising, etc.	£3,621 8 1	
Transfer Agencies, Johannesburg, London and Paris	5,211 5 3	
,, Balance carried to Appropriation Account		280,235 1 6
		£290,251 19 1

By General Revenue, Dividends and Debenture Interest	£290,251 19 1
	£290,251 19 1

APPROPRIATION ACCOUNT.

To Debenture Interest Paid Out	£113,073 12 0
,, Dividend No. 4 of 2½ per cent., declared 30th June, 1915	75,038 14 0
,, Debenture Redemption	57,600 0 0
,, Capital Expenditure	162,184 9 11
,, Licences, Rates, Taxes and Audit Fees, etc.	5,802 0 2
,, South African Income Tax	190 0 8
,, Sundries	568 16 8
,, Balance to Balance Sheet	320,128 0 11
	£734,585 14 4

By Balance as at 31st December, 1914	£361,440 0 3
,, Balance of Expenditure and Revenue Account	280,235 1 6
,, Redemption of Randfontein Central G.M. Co. Debentures held by this Company	86,400 0 0
,, Discount on Debentures purchased for Redemption on 1st March, 1915...	6,510 12 7
	£734,585 14 4

J. C. K. POLLOCK, Secretary.

JAS. H. CROSBY,
N. J. SCHOLTZ.
Directors.

We have audited the Balance Sheet of The Randfontein Estates Gold Mining Co., Witwatersrand, Ltd., dated the 31st day of December, 1915, as above set forth, and have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given us and as shown by the Books of the Company.

S. FLEISCHER.
C. L. ANDERSSON & CO.,
Incorporated Accountants (Eng.).
Auditors

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CONTENTS. PAGE

Notes and News 571

Topics of the Week:

The Rand and the University Question 573
Pensions and Small Holdings for Miners 573
Trade After the War 574
Profits and Ore Reserves of the Government Areas ... 575
Mining Prospects in Namaqualand 576
Electro Chemical Industries for South Africa 577
Position and Prospects of the Wolhuter 578
Progress of Neumann Mines 579
T.C.L. Mining and Prospecting Activity 579
The Daggafontein Scheme in Detail 580
Progress on Barnato Mines 581
Rand Earth Tremors Committee Report—II. 582
Rand Metallurgical Practice—IV. 583
Correspondence and Discussion: " State Mines and the Government "; " The Karroo Coal Controversy " 584
The Week in the Sharemarket 586
The Week in the Mining Material and Engineering Trades 587

Engineering Notes and News:

Local Manufacture of Bearing Metal 590

Notes and News

C. M. & M. Society. Dr. E. T. Mellor, of the Geological Survey, is submitting a paper to the Chemical, Metallurgical and Mining Society at its meeting at the School of Mines this (Saturday) evening, on " The Conglomerates of the Witwatersrand." The paper gives a description and comparative account of the conglomerates of the whole of the Witwatersrand system, based upon the evidence obtained in recent Geological Survey work on the Rand. The special features of the conglomerates which bear upon the origin of the gold in the banket are also dealt with at length, Dr. Mellor as a result of his researches coming to the conclusion that the " placer " theory is more worthy of acceptance than the " infiltration " theory, which has recently been most in favour amongst geologists. The paper, which is being read here at the same time as it is being submitted to the Institution of Mining and Metallurgy in London, promises to give rise to considerable discussion amongst mining men. Dr. Moir will reply at this meeting to the discussion which has taken place on his paper on " Dust in Mine Air and the Causation of Miners' Phthisis." Visitors interested in these subjects are cordially invited to be present.

* * * *

S.A.R. and Coal Industry. Following upon the articles which have recently appeared in the papers regarding the difficulties experienced by the collieries in the Transvaal through the inability of the Railways to give them an adequate truck supply, we have been asked to state for general information the following figures, showing the time and estimated tonnage lost by the collieries in December and January last:—December, 1915: Time lost, 800½ hours; estimated tonnage lost, 90,929 tons. January, 1916: Time lost, 722¼ hours; estimated tonnage lost, 84,214 tons. We are also informed that the Railway is endeavouring to improve the position, and it is hoped that we may be able to publish a more favourable report for the current month.

* * * *

Daggafontein. With the proposal for the reorganisation of the Daggafontein capital we deal in another part of this issue. The most interesting item in the annual report just issued is the enlargement of the mining area. By law the company was entitled to a mynpacht of 1,257 claims. The directors have made a successful application for 179 discoverers' claims, so that the total number secured is 1,436. It will be seen therefore that the mining proposition is large and makes a good allowance for unpayable ground. Should the balance of the farm be proclaimed the company would receive half licenses from the working of 4,847 claims.

* * * *

Worcester Exploration. Mr. W. G. Holford has written a report upon the Worcester Company's Barberton ventures. It is in none too hopeful a strain, and states that the indications are of a gradual cessation of payable values in the main shute. There are indefinite developments which require opportunity for proving. The suggestion is to relieve the company of paying back debts, by consolidating the obligations under a bond on the reserve ore in the pillars. As there are between 51,000 and 52,000 tons available this would be possible and a profit would be earned. If the result of operations should prove unsatisfactory the property would be put into liquidation and the bond could be paid off within two years.

* * * *

Water Supply. It was decided last week, at a meeting of the Rand Water Board, to proceed, in a modified form, with the scheme for supplying the Witwatersrand with water from the Vaal River. Originally the scheme was one for the impounding of twenty million gallons and providing plant to pump ten million gallons to the Rand. It has now been decided to proceed with the erection of the barrage on the original lines, but to instal a plant capable of dealing with only five million gallons. The cost of the scheme is estimated at seven hundred and fifty-eight thousand pounds, including an amount of forty-two thousand already expended on the legal Parliamentary work, the survey, measuring of weirs on the Vaal River, and tributaries. The money will be borrowed from the Board's redemption fund.

* * * *

The Outlook.

The "Business Prospects Year-Book for 1916," besides giving a variety of facts and figures concerning coal, iron, copper, tin, tinplates, oil, money market, shipping, wheat, cotton, and rubber, offers some interesting opinions as to the immediate future. The authors arrive at the opinion that, in general, prices after the conclusion of peace will fall for a time. As to coal and iron, they look for a fall in prices, to be followed a few months later by a rise in prices again. In respect of copper, a lower average price is anticipated after the conclusion of peace. In regard to tin, it is considered that after the war the price will go to over £200 per ton once again. It is anticipated that the demand for oil and subsidiary products will increase, but any tendency to inflation of prices will be checked. It seems a very safe prediction that shipping in the months immediately following the war will witness a very sharp fall in freights. Until the Central Powers are beaten the conditions of shipping will not be relaxed.

* * * *

Liquid Air v. Dynamite.

Liquid air is being substituted for dynamite in all the principal mines of Germany, now that the supply of Chile saltpeter has been cut off, says a writer in the New York *Evening Post*. The use of liquid air as an explosive has been known ever since the famous Professor Linde took out the first patent in 1895. It was used in the building of the Simplon Tunnel, and has been tried in a number of countries, notably France. But until very recently it was regarded as still in the experimental stage. Immediately upon the outbreak of the war it was put into practical operation throughout the German mining industry. The results have proved so successful that it is now certain that it will continue to be used in place of dynamite even after the war. In the first place it is peculiarly safe. "You can take a cartridge—as they call the little black mouse-like bags—put it into the bucket of liquid air which, literally, steams with cold, until the cartridge has soaked up 90 gr. of it, and then, with the assurance that you are dealing with an explosive more than half again as powerful as the ordinary charge of dynamite, you can put it down and step on it, and the only result is a fizz as of so much steam. I saw five of these cartridges jammed with a stick into the holes drilled in the rock, just as if they had been so many wet rags. And then I saw the men running like mad, when the electric current was turned on and the pieces of rock began to fly. The cheapness is another advantage. Over against 20 pfennigs, the approximate cost of a dynamite cartridge, one cartridge saturated with liquid air costs, at this Rammelsberg mine, only 12 pfennigs. And where it is made in larger quantities, the cost is even less. A whole new industry is in the process of development in Germany to manufacture and handle liquid air; and the principal firm, the Marsit Corporation, declares the cost of liquid air to be just one-half that of dynamite.

* * * *

Reserves of Gold.

In the House of Commons in last mail week, Mr. Hume-Williams asked the Chancellor of the Exchequer if he could state what was the reserve of gold coinage in the possession of the Bank of England and in that of the German Imperial Exchequer, respectively, on December 31, 1915; whether it was still obligatory on the Bank of England to deliver gold to all who asked for it in exchange for notes; and if he could state approximately how much of the gold coinage of the country was melted down during the year 1915 by the manufacturers of jewellery. Mr. McKenna replied that, as shown by the Bank of England Return for December 28, 1915 (the last of the year), the amount of gold and silver coin then held by the banking department was £137,977, and the amount of gold coin and bullion held by the issue department was £51,338,430, or, together, £51,476,407. No information had been published since the outbreak of the war as to the state of the German Imperial Exchequer. If by "Imperial Exchequer" the German Imperial Bank was meant, the amount of gold held by the Imperial Bank on December 31, 1915, was, according to the official German return, £122,269,250. The answer to the second part of the question was in the affirmative, and to the third in the negative.

* * * *

Probable Financial Situation After the War.

Sir George Paish, editor of *The Statist*, in the course of an interview, stated that the war had involved practically no destruction of accumulated wealth. "Our loss," he said, "is mainly in the wealth which we fail to create—that is to say, speaking broadly, we are making shells, and not building houses; building warships, and not making railways. Our main loss arises from failure to make reproductive expenditure, and this loss is about £400,000,000 per annum. It is true that we are selling American securities, but we are buying Russian, French and Italian bonds, and on balance there has been little reduction in our investments since the beginning of the war. If each one of us were to live economically during the war, we may not need to meet our great war expenses by realising our capital, although, of course, we shall fail to save during the war the usual four hundred millions a year of our income we use for reproductive purposes—the building of houses, railways, ships, factories, etc. What I have said is mainly from the British point of view. As a whole, the world will not in the period of war save much, and consequently there will be very little expansion in production. On the other hand, the expansion in population will be much smaller than usual, and the economic pressure that would otherwise come from the check to production will thus be minimised. Temporarily there will be economic pressure of considerable severity at the end of the war. That pressure will be caused mainly by the readjustment of conditions from war to peace. I have no doubt that the wealth of the country will grow as rapidly after the war as it did before the war."

* * * *

The Diamond Market.

In restarting its weekly diamond article, the *Financial News* says:—"Much has been heard lately from interested quarters about normal conditions again prevailing in the trade. Neither the De Beers report nor any other reports of the lesser diamond companies bears this out. The consumption of diamonds in Europe (we speak of consumption, not cutting) is nil; the trade, therefore, is dependent upon countries overseas. As exchanges in most cases are against the English trader, business is very difficult. Those of our readers who have followed our weekly pre-war articles on the diamond trade will remember that enormous stocks had then been accumulated through over-production, and had this policy been continued the diamond market, war or no war, would have felt the effects of this ill-conceived policy. As a matter of fact, the January to March quarter of 1914 showed unmistakable signs of a collapse in diamonds. To counteract this the Diamond Syndicate managed to have a Commission appointed to come into line with the Germans, which luckily did not eventuate. . . . A glance at the import figures of diamonds into the United States will convince even the stoutest optimist that the diamond trade is far from normal, and it is likely to remain so for a considerable period. The undertone, however, is good, and with management and due regard to a policy of regulating the supply of rough stones to the demand, our reports, from sources undoubtedly well qualified to form an opinion, lead us to assume that the diamond market can be resuscitated much more quickly than the general public imagine, although we do not for a moment think that shareholders in diamond undertakings can look forward to immediate dividends; for the moment, therefore, dealings in diamond shares cannot be encouraged."

TOPICS OF THE WEEK.

THE RAND AND THE UNIVERSITY QUESTION.

From the point of view of the Rand as the great mining and engineering centre as well as the commercial capital of South Africa, it would seem that the settlement of the University question is deserving of more mature consideration than that hitherto accorded it. Despite the correspondence published in Capetown during the week, we believe nothing is to be lost, but much, possibly, may be gained by a further postponement of Parliamentary sanction for Mr. Malan's present proposals, and the interval, it seems to us, might well be utilized in a more protracted scrutiny and thorough examination of the needs of the Rand in this direction. Our scientific societies, so well qualified by their membership and influence to formulate a case for the Rand, would then have time to consider the important question at issue, in the light of the future of the industry and of the opportunities it holds out to the youth of the country. If the ideal of a great national teaching university is to be reluctantly abandoned as impracticable of attainment, the fact would seem to lose in importance when we come to consider the latter-day developments of University education. As Dr. Hertz pointed out in a striking lecture delivered here a few years ago, the most momentous and epoch-making event in the annals of English culture was the coming into being of six new universities at the beginning of the twentieth century—London, Birmingham, Liverpool, Manchester, Leeds and Sheffield. "No longer far away in cloistered seclusion on the Isis or on the Cam, these have sprung up amid the hurly-burly of modern city life, in ironmongering Birmingham, cotton-spinning Manchester, seafaring Liverpool, cloth-weaving Leeds, and metal-working Sheffield. Behold this is a new thing under the sun!" Dr. Hertz proceeded to show how these institutions like the State Universities of the United States, owed their existence and success to "the fierce international competition in commerce and industry that began a generation ago."

> "This international struggle differs from all previous conflicts in this: Science—cold, elaborate and vigilant—has been enlisted by the newer combatants. Germany, especially, has been the first to recognise that knowledge is power, and that ignorance is weakness. And she has conceived it to be the function of the Higher Schools to help her to the right theory, to the complete science of everything that concerns her in this desperate world-conflict. We had long known that the German is 'scientific' in war, i.e., he leaves nothing to chance, miracle or hurriedly constituted commission. But we have only lately learned that he looked upon every national enterprise as a military campaign, convinced that victory in any department of life belongs to organization, intelligence and preparedness. Germany has thus been the first to discard Plato's mischievous doctrine that the producing and industrial classes needed no education. No form of labour, no manner of industry, no kind of profession is by her considered beneath educational treatment. Hence her craft schools, her technical and commercial universities. Here the future leaders of industry gain a scientific training in the organisation and methods of modern trade and an insight into the forces that control the practical affairs of life. It is an admirable system; and America, Japan, France and Holland have followed Germany's lead. In England, likewise, albeit only recently, the urgent need has been felt of a similar scientific equipment for the battlefield of life."

In this connection it may be recalled that in 1901 Mr. Joseph Chamberlain, as Chancellor of the University of Birmingham, said: "I am convinced that unless we overcome the conservatism of our people in regard to the application of the highest science to the commonest industries and manufactures in our land we shall certainly fall very far behind in the race for a foremost place among the nations of the earth." "Civilization in western countries has now reached the point where no further triumphs await mere vigour undirected by knowledge," said Dr. Hertz. "But it was reserved to the citizens of the great English municipalities to give visible shape to this realization. With keen intelligence of direction and ample funds they have started the urban universities in order that they supply this new knowledge, this latter-day orientation, this national adjustment to recent world-wide developments. They will do inestimable work towards placing the entire commercial and industrial life of England on a scientific and a cultural basis." It is noteworthy that the new Universities, besides, have each a peculiar aspect of their own. The University of Liverpool has its School of Tropical Medicine, Leeds University a School of Textile Industries, while in Birmingham there is a Faculty of Commerce, with University courses in Transport Technique, of Trade and Commercial Law, as well as the departments of the Biology and Chemistry of Fermentation, and a School of Malting and Brewing. The application of all this to the Rand is obvious enough. Indeed, if we might again quote, this time from a report by Prof. H. E. S. Fremantle, the case for further consideration and delay would seem, from the Rand point of view, to be a strong one.

> "It has now been definitely proved," he wrote, "that local Universities arouse real local interest in higher education, enlisting in its behalf the powerful agency of local pride; that they create and foster intellectual life and ambition in the Provinces; that they simulate secondary education throughout the wide zones of their influence; that they rouse, satisfy and rouse afresh the higher ambitions of classes of the community, which without them would remain dormant: that they raise the whole standard and outlook of the new generation of teachers, and that they bring fresh vitality and resource to local industries and commerce. Supply and demand prove mutually stimulating. An eminent Oxford man told me that the North of England would have suffered incalculable loss if the new Universities had not been founded there. One of the chief living educationalists expressed the view that the Napoleonic concentration of French University education in Paris had starved the intellectual life of France. The Colleges in South Africa are so far apart that the disappearance of any of them would necessarily involve intellectual anaemia throughout whole tracts of the country."

Without going any deeper into the question, it is to be hoped that a case has been made out for less precipitate action in South Africa. The claims of the Rand to University education, as set forth recently by our Mayors, merit fuller consideration and deeper deliberation. Our scientific societies, following the excellent lead given by the Society for the Advancement of Science this week, we believe, can do a great deal to help in this direction. In such a cause their powerful aid should not be invoked in vain.

PENSIONS AND SMALL HOLDINGS FOR MINERS.

Though Parliament has only been sitting for a week, two important questions concerned with the mining industry have been advanced a considerable stage. For a well-meaning proposal to create pensions for miners, Mr. W. Rockey is responsible. On Tuesday he was successful in carrying a motion that a Select Committee be appointed "to enquire into and report upon the establishment of and conditions governing a pension fund for all white workers on mines." In the course of his remarks he said the Government and the country had a very real interest in the mine workers of the country. He pointed out that the Premier Mine had a very sound pension scheme. As far as the men were concerned it was a very generous scheme. The men paid only one-fifth of the total contributions. The miners he referred to in his motion had no provision whatever made for them, and by acting in the direction indicated he held that the Government would be conferring a real boon and blessing on a class which was so important to the country. They could not go on serving to get the rich richer and the poor poorer. They had 22,000 mine workers on the Rand who annually earned £7,000,000, and surely a class like that was deserving of consideration. He proposed starting the fund with a two and a half per cent. contribution out of the pay of the men, and he thought the Government could invest it at a reasonable rate of interest. If a fund was started it would have one good result—that the wife and children of a miner at his death would at any rate not be left in a state of abject poverty. It would be a source of compulsory saving, and they would be able to do something for the coming generation. In reply, the Minister of Mines said that the principle of compulsory saving wages was a very difficult one, and miners all the world over, including those on the Rand, were generally rather thriftless. Whether it would be possible to bring about such a general alteration as was proposed of an established system so far as benefit societies were concerned was doubtful. Certainly legislation would be required as to pensions. The difficulties arose from the differing risks of men working underground and on the surface, and with or without machinery. He was doubtful whether a Select Committee would be the best means of dealing with the question, but they might confine themselves to a sort of preliminary inquiry to see whether a scheme could be evolved. On such a basis as that he accepted the motion, which was thereupon carried. We confess that the difficulties in front of Mr. Rockey's proposal as applied to the Rand seem insuperable; but no harm can be done by the proposed enquiry, if conducted by members with some experience of mining conditions here. For Mr. Feetham's proposal in regard to small holdings there is much more to be said. Mr. Malan, indeed, was able to announce that he had prepared a draft Bill dealing with the matter, and this raised it to the plane of practical politics. Mr. Wyndham and Mr. Papenfus spoke strongly in favour of Mr. Feetham's proposal, and had no difficulty in rebutting the arguments of the few faint-hearted opponents of the idea. Further comment, as the Minister of Mines very properly suggested, had better be postponed to the publication of the Bill, now in course of preparation.

TRADE AFTER THE WAR.

In the House of Commons recently there was another discussion on after the war questions, and the latest mail papers give prominence to a detailed report of the speeches. The discussion was opened by Mr. Hewins, who moved that, with a view to increasing the power of the Allies in the prosecution of the war, His Majesty's Government should enter into immediate consultation with the Governments of the Dominions, in order with their aid to bring the whole economic strength of the Empire into co-operation with our Allies in a policy directed against the enemy. Other speakers in the debate were Mr. Peto, Sir A. Mond, Mr. Shirley Benn, Mr. Prothero, Mr. Chaplin, Mr. Mackinder, Sir G. Croydon Marks, Mr. Bryce, and, finally, Mr. Runciman. In the course of the speeches reference was made to the commercial position after the war, the economic resources of the British Empire, German organisation and system, the possibility of the rapid restoration of German scientific competition, the prospect of the United States becoming a dangerous competitor, and very many other points that have been covered in articles that have appeared in our own and other journals during the last eighteen months. Mr. Runciman's reply showed that he regarded the discussion as an important one. Had he regarded it as a merely academic one he would have asked leave of the House to be attending to practical business elsewhere. Any decision which the House or Government came to with regard to trade matters at the present time had a direct bearing either on the strength of the Empire or on the strength of the enemy. He believed that Germany was at last beginning to feel the effects of the blockade. We should be able to make up our vast losses in a shorter period of time than any other State, and it would be our duty, so far as we could, to aid Italy, France, and Russia in the same process. Mr. Runciman proceeded to justify the efforts made to capture German trade. Many firms had built up, during the war, strong connections in South America which he hoped would last long after the war. They had studied their customers' tastes with greater ingenuity than ever in times of peace, and they had made almost unprecedented efforts in commercial travelling. The President went on to refer to efforts made by British manufacturers to take up industries once in German hands—glass, chemicals, dyes, electrical apparatus, etc. It was more than a mere matter of competition with Germany. It ought to be part of our national organisation to see that there was no essential article, either for the arts of peace or for the arts of war, which could not be obtained within the Empire. Government assistance might do a great deal, but not without the personal ability, training, skill and industry of the individual. He laid it down as one of the first necessities of the country that if she was to hold her own during times of war, and when war was over, we must improve our research methods, the education of our people, and the training of our young men. We should not attempt to economise on the money that we now spent on technical colleges and modern appliances. If our present well-managed banking systems could not be more adventurous we must have some additional institutions. Commercial banking must play a large part if we were to hold our own against Germany. We must once more overhaul our patent system. The development of new inventions and the restrictions which we put on their use, may have a greater influence on the extension of our trade and industry than even the juggling of a tariff. The importance of co-operation with the Dominions, the spirit of the Dominions, and the question of foreign shipping competition, were among the other matters referred to by Mr. Runciman in the course of a long speech which is well worth reading from beginning to end by all who are keenly studying the problems of the present hour. Now, repeated the speaker, Germany was a commercially beaten nation if there ever was such. But the real trouble was, when the war was at an end, she might wish to embark upon a new campaign. In this connection it would be necessary for us in making peace to see to it that she did not raise her head. In this connection it is noteworthy that the London Chamber of Commerce had before it recently the report of a special committee on the subject of "Trade during and after the war." The main recommendations, according to the *Financial Times*, are the following:—

1. That any measures which may be considered in connection with trade during and after the war should provide: (a) For preferential reciprocal trading relations between all parts of the British Empire: (b) for reciprocal trading relations between the British Empire and the Allied countries; (c) for the favourable treatment of neutral countries: and (d) for regulating, by tariffs and otherwise, trade relations with all enemy countries, so as to render impossible a return to pre-war conditions and for stimulating the development of home manufactures and the consequent increased employment of native labour.

2. That steps should be taken to prevent the dumping and under-valuation of enemy goods into British markets after the war.

3. That discriminatory taxes be levied on the tonnage of all enemy ships using the ports of the British Empire.

4. That the Government be urged to encourage the production and utilisation of raw materials and manufactured goods within the Empire under such legislative conditions as will prevent their being controlled by or on behalf of subjects of enemy countries.

5. That the naturalisation laws of the Empire be amended so as to prevent the abuses which have been disclosed since the commencement of the war.

6. That further legislation, especially in regard to enemy holdings in British companies or firms, is necessary to safeguard British subjects from the consequences of the policy of the German Government in organising its subjects residing in any part of the British Empire for commercial, industrial, financial and economic purposes in time of peace with a view to military aggression in time of war.

7. That His Majesty's Government be urged to guarantee for a period of years the continuance, by subsidy or otherwise, of new, or "key," industries established prior to and since the commencement of the war.

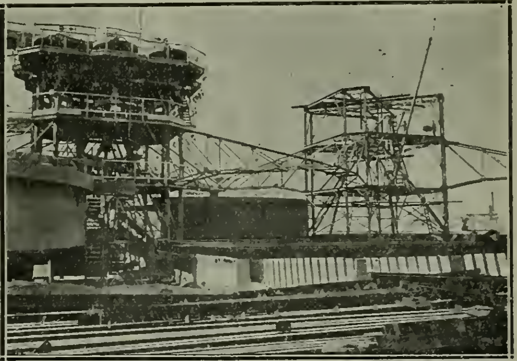
8. That with a view to promoting the development of British trade under altered conditions caused by the war, His Majesty's Government should appoint a Minister of Commerce of Cabinet rank, to whom certain of the functions of the Board of Trade and other departments should be relegated.

On the London metal exchange on Monday standard copper closed at £105 15s. per ton for cash and £104 5s. per ton for forward delivery; electrolytic copper, £135 10s. per ton. Producers sold far ahead with the consequence that there was keen competition on each side of the Atlantic. Remarkable quantities are being consumed, the largest users being America, which alone absorbs 20,000 tons monthly. Straits tin closed at £181 per ton for cash and £180 15s. per ton for three months' delivery.

PROFITS AND ORE RESERVES OF THE GOVERNMENT AREAS.

Errors in Taxation Calculations—Position Made Clear—Big Increase in Ore Reserves.

State Mines: New Tube Mill Foundations.



Additional Cyanide Plant in course of Erection.

In our issue of the 12th instant a paragraph appeared under the heading of "State Mines' Share Valuation Error," in which we corrected a serious error in the *Statist*. In calculating the Government's share of this company's profits on the basis of certain assumed figures, however, we ourselves made the not unusual mistake of adding the super-tax of 10 per cent. to the sliding-scale tax of 26 per cent., making a total of 36 per cent. of the profit, whereas in reality the super-tax in this instance would increase the total tax to 28·6 per cent. There is the further important point that should not be lost sight of when endeavouring to arrive at the Government's share of this company's profits, and that is that the taxable profit is that portion of it which remains after deducting the annual allowance for amortization of capital expenditure.

As our own miscalculation of last week illustrates, there seems to be considerable doubt as to the tax payable to the Government on profits earned by the Government Gold Mining Areas. The following explanation will make the position clear. There are two separate taxes. One is the "sliding-scale tax" and the other the "super-tax." The sliding-scale tax has limitations—it shall not be less than 10 per cent., nor more than 50 per cent. It shall bear the same ratio to the net produce as the latter bears to the value of the precious metals produced. For instance, if the value of precious metals be £100,000, and the net produce £30,000 (*i.e.*, three-tenths), the tax shall be £9,000. The super-tax is as follows:—7½ per cent. of the tax payable under the sliding scale, if such tax does not exceed 20 per cent. of the net produce; 10 per cent. of the tax payable under the sliding scale, if such tax exceeds 20 per cent., but does not exceed 33⅓ per cent., of the net produce; 17½ per cent. of the tax payable under the sliding scale, if such tax exceeds 33⅓ per cent., but does not exceed 49 per cent., of the net produce; 22½ per cent. of the tax payable under the sliding scale, if such tax exceeds 49 per cent. of the net produce. Taking the example given above, where the net produce (£30,000) is 30 per cent. of the precious metals produced (£100,000), and the tax therefore 30 per cent. of £30,000—viz., £9,000—it is thought by some that the super-tax of 10 per cent. in this case would make the total taxation 40 per cent. This is wrong. It would be 30 per cent., plus 10 per cent. of 30 per cent. (equals 3 per cent.), or a total of 33 per cent. Thus the sliding scale tax would be £9,000, and the super-tax £900—total, £9,900—in the event of the net produce being 30 per cent. of the precious metals produced. But it must not be forgotten that "net produce" is not net profits, but is the profits on mining and reduction of the ore, less an annual allowance for amortization of capital expenditure, which, at 3 per cent. compound interest over the workable life of the mine, would produce an amount equal to the amount of such capital. Of course, the 10 per cent. tax under the Profits Tax Ordinance does not apply to this company, nor any legislation imposing a special war levy or other special taxation.

In correcting its calculations, the *Statist* in the last issue says:—Dealing with seven producing companies of the Eastern Rand in our issue of January 1, for the sake of brevity we treated the Government Areas upon the same basis as each of the other companies mentioned. It came to about the same end as to rental to Government and the 15 per cent. allowed off total profit. But in setting out an anticipated dividend outlook of £280,000, or 20 per cent., to shareholders, to be derived from the company's share of the profits of treating 1,100,000 tons a year for a life of 40 years, we based such percentage on the present issued capital of £1,400,000. In taking the view of such a rate and such a capital we may have erred somewhat on the side of inadequate caution, for it has to be borne in mind that at the end of 1914 the company had a floating indebtedness of about £240,000, and it has committed itself to further development expenditure, and to the doubling of its plant so as to attain an annual tonnage of, say, 1,100,000 tons a year instead of the present rate of about 600,000 tons. Apropos of the floating debt, attention may be called to the policy of the company. At the meeting in May last mention was made that the company, under a contract with the Government, had the right by the issue of debentures or the creation of shares, when a favourable opportunity presents itself, to consolidate any debt it may incur. At the meeting of the Johannesburg Consolidated Investment Company in November, the Chairman took the opportunity to point out that the Government Areas Company had obtained the consent of the present lenders of the money to a repayment of the loan being spread over a period of years. The Chairman went on to explain that by accepting this proposition all but a small proportion of the company's profits will become available for distribution in dividends. Then, in addition to the finance feature, it is important to note that the question of the respective share of the company and the Government in the profits made is apparently under consideration, with a view to the removal of defects that have been found to exist since the contract of January, 1910, between the lessees and the Government was entered into. As to appropriations of profit, so far, it is an arrangement with the Government that the first profits, up to an amount of £250,000, are to be reserved from distribution and applied to an increase in the reduction plant. While the whole financial position at the moment is an uncertain one till further light is thrown on the subject at the meeting to be held some months hence, the position from the physical point of view has in recent months indicated distinctly encouraging features. The developments that have been effected are regarded as justifying the expectation of a stoping width of not less than 6 feet, and apparently about such width has been adopted in respect of the ore reserves. These at December 31, 1914, stood at 2,451,581 tons, of an assay value of 24s. 7d. per ton. At the Johannesburg Consolidated meeting it was set out that by September 30, 1915, there had been an increase of approximately 500,000 tons to the ore reserves, making them "over three million tons," and a substantial increase in the assay value of the aggregate." The quarterly report issued this week, dealing with the period to December 31, shows a further increase to the ore reserves of 259,614 tons.

MINING PROSPECTS IN NAMAQUALAND.

[From a Special Correspondent.]

In a presidential address given in Johannesburg to the members of the South African Geological Society recently, Dr. A. W. Rogers referred to the geological features of the copper producing districts of Namaqualand. Details regarding the petrology of rocks containing workable ores are always of scientific interest. They are frequently of considerable economic value, and though there appears to be little connection between mining in the Transvaal and in an outlying portion of the Cape Province the mining situation in Namaqualand appears to be worthy of some attention. Complaints have been heard with regard to the dilatory attitude adopted by the Union Government in opening up the territory once known as German South-West Africa to prospectors and others, who contemplated mining operations in that region. It would perhaps be well if our legislators and others who deal with these matters would give an eye to the condition of affairs in one of the oldest portions of the British Empire in South Africa before going further afield. Reference to official statistics shows that the total mineral production of the Cape Province during the year 1914, amounted in value to £435,986. The principal items in the list of minerals produced are: Copper, £372,028; salt, £35,803; and asbestos, £18,657. Practically all the copper is derived from Namaqualand, where, according to official returns there are two producing companies. Copper is distributed over a large area in the O'Okiep and Concordia districts, where much prospecting has been done during the last twenty or thirty years. Many promising areas have been pegged out, and it is said that the Government have drawn from hopeful mining men considerable sums of money in claim licences. Why should there be in Namaqualand only two producers of a metal which for some time has been gradually increasing in value and the production of which should be of some importance to the Union? The arid character of the country is not an insurmountable obstacle to mining operations, for it is said that in most districts water may be found within a short distance from the surface. The cost of stores delivered at the coast is not excessive, and though the temperatures are high at certain seasons of the year the climate cannot be termed unhealthy compared with many regions where there are a large number of small mining undertakings. For the successful mining and smelting of copper ores, it is frequently necessary to incur large capital expenditure. Namaqualand in 1914 produced over 1,000 tons of ore containing over 23 per cent. of copper; but 95 per cent. of the country's output contained less than 5 per cent. of pure metal. The prospector or small capitalist opening up a mine for base metals must, in the first instance, pick or concentrate his ores as much as possible for shipment to the smelter Overseas. The Union Government have, usually, recognised the difficulties of the prospector anxious to develop a mining proposition. Not only are there low rates for the carriage of undamageable mining machinery from the coast, but railway rates on ores and concentrates for export beyond South Africa are devised to assist mining development. On the South African Railways and C.F.L.M. systems the rates on ores are graduated according to the value of the mineral. Cost of carriage on antimony and lead ores sent to the coast for export is 0·296d. per ton per mile. On copper or tin ores the charges are 0·6d. per ton per mile. In Namaqualand there is but one railway, which runs from Port Nolloth to O'Okiep, the centre of the copper mining district. This railway is under the control of the Cape Copper Co., Ltd., and their charges for transport of goods to or from the coast do not appear likely to foster mining enterprise in the copper belt of the country. Working costs of the railway are probably high and coal for locomotives will, no doubt, form a large item in the expenditure of the company, but the running costs of a railway, like the majority of other concerns, are largely dependent on turnover, and at present the railways in Namaqualand are dealing almost entirely with material directly or indirectly associated with the work of two mining companies. Should an outsider consider the possibilities of working a mine at some distance from the coast the railway rates quoted by the Cape Copper Co., are as follows:—Up traffic from Port Nolloth, inland, 6d. per ton of 2,000lb. per mile; plus 2s. per ton terminal charges. Down traffic from country to Port Nolloth, 3d. per ton of 2,000lb. per mile plus 2s. per ton terminal charges. The charges for landing and shipping goods at Port Nolloth are 6s. 6d. per ton of 2,000lb. Is there any justification for these quotations being about five times the charges operating in other parts of the Union? Ox transport to the coast might be contemplated and here difficulties again crop up. As already mentioned the water supply of the country is almost entirely derived from wells and much depends upon the goodwill of the owner of these wells. Faced by apparently insurmountable difficulties, the owner or lessor of copper bearing ground in Namaqualand may after paying claim licences for a number of years abandon his property in disgust or sell it for a fraction of the money which he has expended upon it. Figures relating to the revenue derived by the Government from mining licences in Namaqualand would probably be of some interest to the mining community: What is the number of base metal claims which have been pegged out and abandoned in the country during the last twenty years? Trusts, combines and other forms of monopoly in mining or other industry do not usually tend to the well-being or advancement of a country. There have been made suggestions that all the railways in South Africa should be under the control of the Government, but recent enquiries with regard to the property of the Cape Copper Co., Ltd., show that there is no immediate prospect of the Namaqualand lines being expropriated. The Government have undoubtedly many difficulties as regards finance, and will probably assume control of what should be public undertakings at the earliest possible occasion, but in the interests of the Union generally it seems desirable that there should in the meantime be some investigation into the condition of mining affairs in the North-Western portion of the Cape Province.

MINING EXAMINATIONS.

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ELECTRO-CHEMICAL INDUSTRIES FOR SOUTH AFRICA.

Important Report by Development of Resources Committee of the S.A.I.E.E.

The following report, prepared by the Development of Resources Committee, on the possibility of establishing on a commercial basis certain electro-chemical industries, was sent to the Government Munitions and Industries Committee, Johannesburg, in January:—

This report, which has been prepared by a Committee of the South African Institute of Electrical Engineers (known as the Development of Resources Committee), has for its purpose to call the attention of the Government and others to the possibilities of manufacturing locally, by the aid of Electrical Power, several articles of very great commercial importance which are now either being *imported* or of which there is little or no importation owing to the cost of transport from Overseas. The existence of the war seems to the Committee to render the present time especially opportune for the consideration of this subject, because the need for encouraging local manufactures has never been greater than it is now. The report deals with materials produced by synthetic chemistry, and especially the manufacture of various valuable compounds which can only be obtained by the high temperature available in electric furnaces. The extent to which these processes have been applied in other countries will be appreciated from the fact that there are produced in the world annually, by means of the electric furnace, about a million tons of manufactured product, of which the value is probably in excess of £20,000,000. The report does not attempt to cover the whole subject, but is confined to the consideration of materials which are most necessary for our chief industries—namely, Agriculture and Mining. These industries, taken together, now require annually more than two million pounds worth of chemicals, all of which are imported in the form of fertilizers, Cyanide and Nitrates. If, as indicated by this report, any considerable proportion of these articles can be produced locally, it is evident that it will be greatly to the advantage of South Africa. The essential elements for successful manufacture of the compounds considered herein are cheap electricity, abundant coal, limestone and the necessary labour. All of these elements exist in South Africa, and, furthermore, the local market is to a considerable extent protected from competition by the necessarily high costs of transport chargeable on imported articles, as well as by customs duties. In the succeeding paragraphs the following compounds are considered, and estimates given for their local production, together with the approximate present costs of similar imported articles. The cost of electric power required is also dealt with.

Calcium Carbide.

Calcium Carbide has so far been used in South Africa mainly for the production of acetylene gas for lighting, but is of still far greater potential value for the production of cyanamide, from which in turn the other important products referred to herein may be derived.

	About.
Amount of imports of Calcium Carbide in 1913	2,600 tons.
Approximate value imported	£60,000
Estimated factory cost for local production (based on the assumptions stated in Appendix (1)	£35,850

Further particulars (based on the assumptions stated) and an estimate of cost of local production are contained in Appendix (1). The cost of electric power has been taken to be 0·35d. (See Appendix (2). For the sake of comparison, figures are given based on a production of only 2,600 tons per annum, but as it seems reasonable to assume that a very much larger production might be anticipated, especially in view of the possible production of cyanamide, and that lower costs will result from manufacturing on a larger scale, estimates have also been prepared on the cost of producing respectively 5,000 and 10,000 tons per annum.

Cyanamide.

Cyanamide is a very valuable derivative of calcium carbide and is used principally as a fertiliser. In Europe by far the greater part of all the calcium carbide produced is converted into cyanamide, of which no less than 260,000 tons was produced in 1913. Commercial cyanamide contains about 20 p.c. of nitrogen, and as a fertiliser is, therefore, approximately equivalent to an equal weight of sulphate of ammonia, or to one and a quarter times its own weight of nitrate of soda. The process of manufacture is simple, the necessary reaction being obtained by passing nitrogen gas over red hot calcium carbide. The solid mass resulting is then crushed and sufficient water added to expel the traces of acetylene gas. The cost of cyanamide at South African Coast ports was, prior to the war, £13 per short ton (2,000lb.). As shown in Appendix (3), the estimated factory cost of local production (based on the assumption stated) is £9 per ton. The pre-war cost of sulphate of ammonia (an equivalent fertiliser) was £15 per ton.

Derivatives of Cyanamide.

In addition to its utility as a fertiliser, cyanamide is valuable because of the readiness with which it can be induced to part with its nitrogen molecule to form many of the compounds used in the manufacture of modern explosives, including nitro-glycerine, cordite, lyddite, melinite, and other nitro-cellulose compounds. Ammonia and Nitric Acid.—When acted on by super-heated steam, cyanamide is converted into calcium hydrate, carbon and ammonia, and by the Ostwald process the ammonia is oxidised to nitric acid. Dicyandiamide.—By leaching cyanamide with hot water and precipitating lime with CO_2, dicyandiamide is obtained, which is used in the dye industry and as a deterrent in nitro-explosives. Sodium Cyanide.—Appendix (4) deals with the production of sodium cyanide from cyanamide. South Africa, during the year 1914, consumed 10,518,000lbs. of sodium cyanide having a total value of £454,743. Other Products.—Appendix (5) deals very briefly with the production of nitric acid from the atmosphere by means of electricity, and draws attention to the application of electricity to iron and steel manufactures.

Conclusions.

In the opinion of the Committee, the conclusion which may safely be drawn from the above considerations is that the various products herein dealt with can be profitably manufactured in South Africa, provided the necessary raw materials are obtainable at about the costs which have been assumed. These costs in turn depend upon the geographical distribution of such raw materials in relation to the available sites for the generation of cheap electricity. An early investigation with regard to the location, quality and cost of production of these raw materials is, therefore, a matter of the greatest possible importance, and it is hoped that this report will be the means of stimulating activity in this direction. Whilst the Institute will, at all times, be anxious and ready to render any technical assistance within its power, and will be glad to place at the disposal of the Government the further details which have already been acquired and used in the preparation of this report, the collection of further data will require the expenditure of a certain sum of money not at the disposal of the Institute. The Committee feels that this is a matter which should engage the serious consideration of the Government, and it is hoped that the Government Munitions and Industries Committee, or some other suitably constituted body, will take the matter in hand forthwith.

(To be continued.)

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POSITION AND PROSPECTS OF THE WOLHUTER.

Big Increase in the Ore Reserves— Profits Maintained—Working Costs Reduced.

THE Wolhuter has had another very satisfactory year. The tonnage milled during the twelve months ended October 31 last, shows an increase of 23,350 tons over the previous year, it being 406,050 tons, whilst the average profit per ton has decreased from 8s. 0·5d. to 7s. 6·4d., the total profit being £153,011, against £153,858 for the previous year, or a decrease of £847 in the total profit obtained. The best feature of the report is the fact that the payable ore reserves show an increase from 999,400 tons, assaying 5·9 dwts. over 53·4 inches, to 1,263,320 tons, assaying 5·8 dwts. over 53·2 inches. During the year under review three claims, with an actual area equal to 2·6592 claims, on Farm Doornfontein No. 24, and water-right No. 329, were acquired from the New Spes Bona Gold Mining Company, Limited. The purchase consideration paid for these claims and the water-right was £2,057. The company's property holdings, therefore, now consist of:—Mynpacht and claims, equal in area to 165·6856 claims; mineral rights under bewaarplaatsen and water-rights acquired from Government, 12·3264 claims; a total of 178·0120 claims.

The Appropriation Account shows: Balance brought forward from 31st October, 1914, £39,536 2s. 5d.; profits earned during the year, £153,011 3s. 9d.; sundry revenue, £2,651 19s. 3d.; total, £195,199 5s. 5d. Less Auditors' Fees and Profits Tax for previous year, £11,843 18s.; Directors' extra remuneration in accordance with the Company's Articles of Association, £1,000; expenditure on capital account, £15,621 5s. 11d.; fifth annual instalment paid to Government on account of purchase price of Mineral Rights under Bewaarplaatsen and water-rights, £7,931; contribution to Miners' Phthisis Compensation Fund and English Income Tax, £5,090 2s. 2d.; total, £41,486 6s. 1d.; a grand total of £153,712 19s. 4d. Dividends Nos. 15 and 16 declared and paid, £107,500; leaving a balance of £46,212 19s. 4d. The capital expenditure for the past year has been as follows: Property, £2,133 15s. 3d.; buildings, £94 0s. 9d.; machinery and plant, £3,188 8s. 4d.; shafts, £9,759 2s. 10d.; furniture, £64 0s. 3d.; investments, £391 18s. 6d.; total, £15,631 5s. 11d.; less livestock, vehicles and harness, written off, £10; total, £15,621 5s. 11d.

The Consulting Engineer, Mr. D. Wilkinson writes:—I have pleasure in confirming your manager's report, which gives details of the operations for the past financial year. The principal features, compared with the previous year's results, are as follows:—

	Tons Milled.	Yield per ton.	Costs per ton.	Profit per ton.	Total Profit.
1914	382,700	25/0·4	16/11·9	8/0·5	£153,858
1915	406,050	24/4·1	16/ 9·7	7/6·4	£153,011

There was an increase of 23,350 in the tons milled, a decrease of 8·3d. in the yield, of 2·2d. in the working costs, and of 6·1d. in the profit per ton milled, resulting in a decrease of £847 in the total profit. The decrease of 2·2d. per ton in the working costs is satisfactory considering the increased cost of stores caused by the war. Cross-cutting, driving, raising and sinking totalled 13,320 feet, a decrease of 2,090 feet as compared with the previous year. The tonnage developed for the year amounted to 627,570 tons, of which 478,310 tons, equal to 76·2 per cent., is estimated as profitable under present conditions, having an average value of 6·3 dwts. over an assumed stoping width of 52·8 inches. The cost of developing this ore is included in the working costs. During the year, 477,867 tons were mined from all sources, but the amount drawn from the ore reserves was only 254,040 tons, 53·2 per cent. This percentage will increase in future, as more complete information as to width and value has enabled an estimate of the tonnage recoverable to be made on certain reclamation blocks, which are now included in the ore reserves. As for the previous year, the development of a large tonnage and the mining of a low proportion from reserves have resulted in a considerable increase in the ore reserves, which are now estimated at 1,263,320 tons of an average value of 5·8 dwts., over 53·2 inches, compared with 999,400 tons of an average value of 5·9 dwts. over 53·4 inchs as at October 31st, 1914. The capital expenditure for the year was £13,096 ,a decrease of £6,353 as compared with 1914, the man items being shaft sinking and stations, and the completion of the electrification of the mill. Shaft sinking is now completed, and there remains but a small amount of work to be done on stations, ore boxes, etc. The electric drive for the mill has been in operation since May last, and has proved very satisfactory. Preparations are now being made for filling current sand into the western section of the mine for the purpose of giving greater stability to the strata overhanging the exhausted areas, and to render possible the mining of almost all the pillars in this section.

In the course of his report, the Manager, Mr. E. E. Hardach writes:—The total development footage for the year is 13,320 feet. Of this footage 11,259 feet have been sampled, averaging 5.2 dwts., over an estimated stoping width of 54.1 inches. One hundred and seventy-eight feet of shaft sinking have been done, also various stations and ore bins have been cut.

Ore Developed.—The ore developed or exposed during the year is as follows: Estimated payable tonnage, 478,310 tons valued at 6.3 dwts. over 52.8 inches; estimated unpayable tonnage 149,260 tons valued at 2.9 dwts. over 55.0 inches. Ore Reserves.—The re-estimation of the ore reserves to the 31st October, 1915, shows: Ore reserves 1,263,320 tons; grade, 5.8 dwts.; stoping width, 53.2 inches. These are made up as follows: Pyritic quartzite, 59,790 tons, valued at 6.1 dwts. over 60 inch stoping width; Main Reef, 414,960 tons, valued at 4.4 dwts. over 55. inches stoping width; Main Reef Leader, 341,230 tons, valued at 7.9 dwts. over 50.1 inches stoping width; South Reef, 447,340 tons, valued at 5.5 dwts. over 53.4 inches stoping width; total, 1,263,320 tons, valued at 5.8 dwts. over 53.2 inches stoping width. Mining.—The following is approximately the tonnage mined from each reef during the year: Main Reef, 120,296 tons; South Reef, 193,919 tons; Main Reef Leader, 143,715 tons; Pyritic Lode, 19,937 tons; total ore sent to crusher house, 477,867 tons. The various sources from which the ore mined was obtained, with tonnages, is as follows: From payable blocks, 254,040 tons; from previously estimated low grade, 63,320 tons; from reclamation, 71,819 tons; from development, 36,688 tons; from excess stoping width and other sources, 50,000 tons; total, 477,867 tons. Crushing and Sorting.—Approximately 477,867 tons of rock were sent to the crusher house, of which 72,117 tons, equal to 15.091 per cent., were discarded as waste. Milling.—Ore sent to crusher from 1st November, 1914, to 31st October, 1915, 477,867 tons; discarded as waste, 72,117 tons; total, 405,750 tons; in mill ore bins, 1st November, 1914, 600 tons; total 406,350 tons; tons milled, 460,050 tons; in mill ore bins, 1st November, 1915, 300 tons.

Financial.—The total working expenses amounted to £341,224 12s. 11d., made up as follows:—

	Cost			Cost per Ton milled. s.	d.
Mining...	£126,680	11	14	6	2.876
Hauling	23,814	6	0	1	2.076
Mine Pumping	5,059	10	11	0	2.990
Underground tramming and shavelling	29,962	5	1	1	5.709
Development	32,923	8	4	1	7.460
Underground administration ..	11,876	11	11	0	7.020
Ore transport, crushing and stoping	11,793	16	6	0	6.971
Milling	35,053	12	0	1	8.719
Cyaniding	24,880	16	0	1	2.706
General mine charges	28,028	3	1	1	4.566
General charges	11,151	8	2	0	6.591
Total	£341,224	12	11	16	9.684

Revenue.—The revenue amounted to £494,235 16s. 8d., made up as follows:—Value of yield from mill, £357,085 6s. 5d. (17s. 7.059d. per ton milled); value of yield, cyanide works, £137,150 10s. 3d. (6s. 9.064d. per ton milled); total revenue, £494,235 16s. 8d. (24s. 4.123d. per ton milled). Profit.—The total profit, £153,011 3s. 9d., was made up as follows: Revenue, £494,235 16s. 8d. (24s. 4.123d. per ton milled); working expenditure, £341,224 12s. 11d. (16s. 9.684d. per ton milled); profit, £153,011 3s. 9d. (7s. 6.439d. per ton milled. Shaft sinking was completed during the year and the cutting and equipping of the stations and ore bins for the bottom levels is being done and should be finished early next year. The underground pumping plant is being centralised by abandoning three intermediate stations, and when finished will consist of three stations at the east, one at the west, and one at the mynpacht shaft. A 550-h.p. motor has been installed to run the mill and has proved very satisfactory, giving almost complete running time.

"T.C.L." MINING AND PROSPECTING ACTIVITY.

Points from the Quarterly Report.

In their interim report for the period October 1 to December 31, 1915, the directors of the Transvaal Consolidated Land and Exploration Company state that inquiries for purchase of farm property continue to be few, and only three farms have been sold during the quarter, one each in the districts of Heidelberg, Piet Retief and Zoutpansberg. Sales in the company's townships show a falling off during the quarter, except in the coloured township of New Clare, where the sales continue satisfactory. As a result of the continuance of the policy of building loans to purchasers of ground, the sales in the Braamfontein Company's various townships during the quarter have been satisfactory. The reports from the company's stock farms during the quarter have been, on the whole, satisfactory. Certain parts of the Waterberg district have been adversely affected by spells of drought, and the crops in this district, as also in portions of the Middelburg district, have suffered from the severe hail-storms which have prevailed. No new leases of farms have been issued during the quarter, but three leases which expired, have been renewed with the same tenants.

Mining and Prospecting.

Mutue Fides Tin Mine.—Prospecting mining and milling operations have continued during the quarter. Good rains have fallen, and there is sufficient water in the dams to continue milling for some months. Labour shortage has considerably hampered mining operations. The output for the quarter was approximately 48 short tons concentrate.

Dientje No. 552, District Lydenburg.—Driving has been continued on the reef located in the mynpacht. No profitable values have been disclosed, and unless an improvement takes place work will shortly be discontinued.

Groenfontein Tin Mine.—The footage for the quarter was 292 feet, of which 197 feet were profitable. The plant dealt with Zaaiplaats Lease ore during the first half of the quarter. Groenfontein ore was treated during the latter part of the quarter, but the resulting product has not yet been dressed and bagged, and no output has, therefore, been declared. The ore reserve dump at the surface at the end of the quarter was 1,563 tons, estimated to contain 62·91 tons of 70 per cent. concentrate. The cut across the valley alluvial for the purpose of exposing the pay gravel was continued, but progress was hampered by a big fall of ground. Labour shortage has considerably curtailed mining operations.

Rietfontein No. 3 and Rietfontein No. 1638, District Waterberg.—Prospecting operations for tin and molybdenite were continued for part of the quarter. Eight tons of copper molybdenite ore were sent to Groenfontein Tin Mine for extraction experiments. Work was suspended owing to an acute shortage of labour.

Mining Interests Held by the Company.

Rietfontein (T.C.L.), Limited.—Very little further work was done on the 3rd level in consequence of a heavy influx of water which temporarily overcame the mine pumps. Owing to the difficulty of obtaining a satisfactory extraction of gold from the ore and to the exhaustion of the ore reserves, it became impossible to run the mine any longer under existing conditions except at a loss. Metallurgical experiments have indicated the posibility of improving the recovery, but considerable further expenditure on additions to plant would be necessary to accomplish this, and, before such expenditure could be incurred, sufficient ore reserves would have to be accumulated to justify it. Considerable repairs to the plant are also required. In consequence of the position, the shareholders decided in general meeting in December to place the company in voluntary liquidation. The T.C.L. Company has, since the close of the quarter, taken the property over under its bond.

Fairview (T.C.L.), Limited.—1,264 feet of development have been done during the quarter. 5,300 tons were milled of an average value of 10·43 dwts. The quarter's operations resulted in a profit of £1,107.

Swaziland Tin, Limited.—101 long tons of concentrate were produced during the quarter, yielding an estimated profit of £4,710. A dividend of 7½ per cent. (1s. 6d. per share) was declared on December 22, 1915 .

Zaaiplaats Lease.—Milling operations at the Groenfontein battery were completed during the quarter, and resulted in a recovery of 57·12 short tons of tin concentrate.

Mutue Fides and Tygerpad Tributing Area.—Work has been continued by the tributors, and it is understood that the milling plant is still in course of erection.

PROGRESS ON THE NEUMANN MINES.

Points from the Quarterly Reports.

The following particulars of development results appear in the quarterly reports of the directors of the Neumann mines:

Witwatersrand Deep.—Of the total development 1,408ft. or 66·10 per cent., have been on reef. Altogether, 1,353·5ft. have been sampled. This total comprises 718·5ft., or 53·08 per cent., averaging 10·64 dwts. over 37·62 inches, and 635ft. or 46·92 per cent., averaging 5·88 dwts. over 25·98 inches. The payable ore developed during the quarter ended December 31, 1915, was 117,917 tons, assaying 6·89 dwts. over 59·79 inches. The ore reserves as at December 31, 1915, are being calculated.

Consolidated Main Reef.—Excluding main cross-cuts, other cross-cuts, and prospecting work, shaft winze and raise, shaft and stations, 2,663ft., or 78·2 per cent., of the development work have been on reef. Of this 1,682½ft., or 63·2 per cent., have been payable of an average value of 9·5 dwts. over 51 inches; and 980½ft., or 36·8 per cent., have been unpayable of an average value of 2·8 dwts. over 51 inches. Of the payable portion 1,449ft., or 86·1 per cent., have been on Main Reef Leader, of an average value of 9·8 dwts. over 51 inches; and 233½ft., or 13·9 per cent., have been on South Reef of an average value of 8·4 dwts. over 48 inches. The ore reserves at September 30, 1915, were 869,630 tons, and the ore developed for the quarter amounted to 44,520 tons, making a total of 914,150 tons. The ore reserves at December 31, 1915, were 845,040 tons.

Knight Central.—The west subsidiary shaft has been sunk 96½ft. to a total depth of 429ft., and timbered 130ft. to 350ft. On the 17th level a station has been cut and development has begun. The east main shaft has been sunk 56½ft. to a total depth of 4,712ft. and timbered 55ft. to 4,690ft. A further 20ft. of sinking will carry this shaft to the required depth. The east subsidiary shaft has been sunk 123½ft. to a total depth of 396ft., and timbered 80ft. to a total depth of 290ft. A borehole drilled from the bottom of the 16th level west auxiliary winze has located the Main Reef, thus proving the dyke to be about 60ft. thick, and to displace the reef horizontally about 140ft. The core showed a value of 6·2 dwts. over an estimated stope width of 76 inches. The 17th level station has been cut and development is proceeding on this level. The drives on the 16th level from the east and west shafts have been connected, thereby greatly improving the ventilation of the lower levels. Exclusive of main cross-cuts, ore passes and prospecting work, 2,232½ft., or 80·70 per cent., of the development work have been on reef, of which 2,100 feet have been sampled. North of Simmer Dyke.—A total of 1,380ft. has been sampled, of which 960ft., or 69·57 per cent., average 8·4dwts. over an estimated stoping width of 50 inches, and 420ft., or 30·43 per cent., average 2·4 dwts. over 64 inches. South of Simmer Dyke.—A total of 720ft. has been sampled during the quarter, averaging 2·9 dwts. over 53 inches. The ore reserves are being re-calculated for the annual report.

THE DAGGAFONTEIN SCHEME IN DETAIL.

The Provision of Further Capital—Substantial Improvement in the Terms Obtained.

The following circular, and relative proposal, have been officially issued by Henderson's Transvaal Estates, Limited, the secretaries to the Daggafontein G.M. Company:—

The Daggafontein Gold Mining Company, Ltd.

Dear Sir or Madam,—I beg to give you notice that an extraordinary general meeting of the above company will be held at River Plate House, Finsbury Circus, London, E.C., on Monday, January 24, 1916, at 12.5 p.m., or so soon thereafter as the business of the ordinary general meeting of the company, convened for the same day at 12 o'clock noon, shall have been concluded, when the proposal contained in a letter dated January 12, 1916, addressed by the Consolidated Mines Selection Company, Limited, to this company, a copy of which is enclosed herewith, will be submitted for the approval of the shareholders.

The proposal, it will be seen, is a substantial improvement on the terms indicated in the circular sent you on December 8 last, as this company will receive 268,253 shares in the new company, credited as fully-paid (equivalent to one share in the new company for every two shares in the present company), instead of 178,835 shares as originally proposed (equivalent to one share in the new company for every three shares in the present company). This company will also have the option to subscribe for a further 134,126 shares of the new company at par for three years from the registration of the new company.

It will also be seen that, instead of an initial working capital of £100,000 being provided, the new company will have a minimum working capital of £300,000 available for development work.

Of the two directors to be nominated by this company under Clause 8 of the letter, one will, by arrangement with Henderson's Transvaal Estates, Limited, be nominated by that company.

Your directors, two of whom are also directors of Henderson's Transvaal Estates, Limited (which company has entered into an arrangement with the Consolidated Mines Selection Company, Limited, under which it participates to the extent of 20 per cent. in the obligations and benefits referred to in Clauses 4, 5 and 6 of the above letter), strongly recommend the acceptance of this proposal by the shareholders.

A form of proxy is enclosed for the use of shareholders who may be unable to attend the meeting, and the directors in whose favour the proxy is made out, will follow any instructions for its use. To be available, the proxy must reach the offices of the company not later than 12 o'clock noon on Saturday, January 22.—By order of the Board,

Henderson's Transvaal Estates, Ltd., Secretaries,
H. B. BROWNE.

Egypt House, 36, New Broad Street, London, E.C.,
January 14, 1916.

The Consolidated Mines Selection Co., Ltd.,
5, London Wall Buildings, London, E.C.,
January 12, 1916.

The Chairman and Directors,
The Daggafontein Gold Mining Co., Ltd.,
Egypt House, E.C.

Gentlemen,—Referring to the negotiations which have taken place with regard to the provision of further capital for the development of your company's properties, we beg to set out the terms upon which this company will be prepared to find such capital:—

1. A new company, to be registered under the laws of the Transvaal, with an initial capital of £540,000 in £1 shares, and with a memorandum and articles of association in the form already approved by us.

2. Your company to sell to such new company its mining property and all its assets (except as mentioned below) free of liabilities, in consideration of the allotment to your company of 398,033 fully-paid shares of such new company and the grant to your company of an option to subscribe for a further 134,126 shares of the new company at par for three years from the registration of the new company.

3. As regards the debt owing by your company to Henderson's Transvaal Estates, Ltd., 129,780 of the fully-paid shares to be allotted to your company and certain shares and investments of your company of an estimated value of £17,000 are to be transferred to Henderson's Company in full discharge of such debt, it being understood that Henderson's Company is prepared to accept satisfaction in this form. This will leave 268,253 shares and the options to be retained by your company, and the above-mentioned shares and investments of an estimated value of £17,000 will be excluded from the sale to the new company.

4. This company is to subscribe or procure responsible subscribers at par for 100,000 shares of the new company as working capital immediately upon the registration in the Union of South Africa of the new company, such shares to be paid up as and when required by the new company.

5. When and as required this company is further to subscribe or procure responsible subscribers at par for a further 200,000 shares of the new company at any time within two years from the registration by the new company.

6. As consideration for the above obligations this company is to have the option to subscribe for the following shares of the new company—viz.:—

115,874 shares for the first three years from the registration of the new company at par (making with the 134,126 shares under option to your company a total of 250,000 shares under option for such period).

125,000 shares for four years at £1 2s. 6d.

125,000 shares for five years at £1 5s.

The articles of the new company to give the directors power to increase the capital to answer such options.

7. Registered option certificates are to be issued in respect of the shares under option, and a register kept thereof and such certificates to be transferred by ordinary transfer; also provision to be made for bearer option certificates.

8. We to have the right to approve of the constitution of the first board of directors, which shall consist of six members, two of whom shall be nominated by you.

9. The technical management of the new company's mining operations to be provided by this company upon the terms customary for such services on the Witwatersrand, and the remuneration not to exceed that paid by the Springs Mines, Ltd., when in similar stages of development.

10. The new company is to appoint a London committee, which is to consist of three members, one of whom shall be appointed by you, and the other two by ourselves. The London office accommodation for such committee will be provided by Henderson's Transvaal Estates, Limited.

11. Formal agreements to be subsequently entered into between your company and the new company for the sale on the above terms and between your company and Henderson's company for satisfaction of the debt to the latter as above, and between the new company and this company for the provision of the working capital and the grant of the options.

We suggest that, if the above terms are acceptable to your board, they should be forthwith submitted for the approval of your shareholders in general meeting, the resolution approving the same to authorise your board to settle the details of the formal contracts, and we would ask you for a definite reply without delay.—We are, gentlemen, yours faithfully,

The Consolidated Mines Selection Co., Ltd.,
(Signed) Charles W. Moore, Secretary.

In brief, the proposal is as under:—

Old company capital	£536,507
New company capital	£540,000
	Shares.
To clear off debt	129,780
To old shareholders (one new for two old shares)	268,253
Option at par for three years to shareholders—one option share in respect of each two shares held	134,126
Issue at par (guaranteed) for working capital:—	
Immediate	100,000
Later	200,000
Options to guarantors:—	
Three years' option at par	115,874
Four years' option at £1 2s. 6d. p. share	125,000
Five years' option at £1 5s. per share .	125,000
	1,198,033

PROGRESS ON BARNATO MINES.

Increased Working Costs—Improved Position at the State Mines, Van Ryn Deep, and "Knights."

The reports of the directors of the Barnato mines for the quarter ended December 31 have the following:—

CONSOLIDATED LANGLAAGTE.

There was an increase of 5,700 tons in the quantity of ore milled as compared with the previous quarter, and working costs were about fivepence per ton higher. The recovery value of the ore crushed showed a decrease of about one shilling per ton, and as a result the gross profit was less than that for the preceding three months by £7,850. The east incline shaft was sunk 145 feet to a total depth of 3,645 feet, and the west incline shaft was sunk 74 feet to a total depth of 3,216 feet. The development footage sampled totalled 3,100 feet, and gave the following results: Payable, 1,650 feet, having an average value of 15·65 dwts. over 22 inches of reef. Unpayable, 1,450 feet, having an average value of 4·47 dwts. over 18 inches.

GINSBERG.

The quantity of ore milled was 330 tons higher than that for the previous quarter, but, as the grade was slightly lower, and the working costs were the turn higher, the gross profit was reduced by £1,170. The development footage sampled totalled 483 feet, and gave the following results: Payable, 400 feet, having an average value of 14·5 dwts. over 20 inches of reef. Unpayable, 83 feet, having an average value of 2·3 dwts. over 35 inches.

GLENCAIRN.

Working costs were increased by about tenpence per ton, and there was a decrease of 2,760 tons in the quantity of ore crushed as compared with the previous quarter. However, the recovery value of the ore milled showed an improvement to the extent of ·822 shilling, and the net revenue from accumulated slime treatment was increased by about £200, so that the gross profit was £82 higher than that for the previous quarter. Of the total ore milled, 17,980 tons were obtained from reclamation and other sources, and the ascertained ore reserves were depleted by 44,430 tons.

GOVERNMENT AREAS.

The tonnage crushed was increased by 9,500 tons as compared with the previous quarter. Working costs were slightly higher, and as the recovery value of the ore milled was about sixpence per ton less, the gross profit was reduced by £1,098. The development footage sampled totalled 4,150 feet, and gave the following results: Payable, 3,370 feet, having an average value of 12·8 dwts. over 50 inches of reef. Reef only partly exposed, 270 feet, having an average value of 5·3 dwts. over 27 inches. Unpayable, 510 feet, having an average value of 2·7 dwts. over 43 inches. The payable ore reserves were increased during the quarter by 259,614 tons. Certain portions of the additional reduction plant have now been delivered on the property, and the work of erection has been commenced.

NEW PRIMROSE.

There was a decrease of 2,000 tons in the quantity of ore crushed, and working costs were increased by over fourpence per ton as compared with the previous quarter. The grade of the ore milled showed a further decline to the extent of over a shilling per ton, and the gross profit was reduced by £5,214. The development footage sampled totalled 173 feet, and gave the following results: Payable, 70 feet, having an average value of 14·7 dwts. over 29 inches of reef. Unpayable, 103 feet, having an average value of 7·1 dwts. over 11 inches.

NEW UNIFIED.

As compared with the previous quarter, the tonnage crushed was increased by 250 tons and working costs were eightpence per ton higher. There was a slight improvement in the grade, and the net revenue from treatment of accumulated slime was increased by over £100. The gross profit showed a reduction of £1,055, due to the increased working costs. The development foitage sampled totalled 410 feet, and gave the following result: Payable, 320 feet, having an average value of 28·7 dwts. over 11 inches of reef. Unpayable, 90 feet, having an average value of 9·0 dwts. over 12 inches.

VAN RYN DEEP.

The tonnage crushed was less than that for the previous quarter by 960 tons, and working costs showed an increase of over eightpence per ton. On the other hand, the grade of the ore milled improved to the extent of one shilling per ton, and the gross profit for the quarter was increased by £1,917. The east incline shaft was sunk 19 feet to a total distance of 3,386 feet, and the west incline shaft was sunk 85 feet to a total distance of 4,062 feet. The main haulage north-east from the 7th level east shaft was advanced 291 feet, and has attained a length of 1,038 feet. The connecting haulage from the 5th level east was driven 292 feet and has attained a length of 572 feet. The development footage sampled totalled 1,156 feet, and gave the following results: Payable, 1,026 feet, having an average value of 25·0 dwts. over 25 inches of reef. Unpayable, 130 feet, having an average value of 7·6 dwts. over 15 inches.

WITWATERSRAND.

There was a decrease of 280 tons in the quantity of ore milled, and working costs were about sixpence per ton higher, as compared with the previous quarter. This was compensated by an improvement in the grade, and the gross profit was £496 higher than that for the preceding three months. The southern incline shaft was sunk 169 feet to a total distance of 1,750 feet. The development footage sampled totalled 1,460 feet, and gave the following result: Payable, 1,110 feet, having an average value of 10·3 dwts. over 41 inches of reef. Unpayable, 350 feet, having an average value of 2·5 dwts. over 62 inches.

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

RAND EARTH TREMORS COMMITTEE'S REPORT.—II.

Exhaustive Review of the Subject—Historical and Descriptive—Valuable Recommendations.

18. *Comparison of Shocks felt North and South of Outcrop.*—There does not appear to be any marked difference in the intensity of the shocks in the southern and northern suburbs of the town, but the larger number of notifications are received from the northern and central districts, probably due to the fact that the population there is much greater. Very heavy shocks are felt on the mines themselves, especially in individual cases, where some occurrence has taken place in the workings more or less directly underneath, but the shocks experienced to the south at places not immediately over the mines appear to cause less alarm than those felt in the north. A theory advanced by Mr. H. E. Wood, to account for this, and one which commends itself to the Committee as probable, is that, assuming the origin to be in the mines, shocks travelling north go through undisturbed and solid ground on the footwall, whereas those travelling south have to traverse strata which are more or less fractured, and such ground would tend to deaden the waves more readily.

19. *Comparison of Shock with Earthquake.*—There is a very distinct difference between the local earth tremor or shock and an earthquake, both in the physical sensation and in the records obtained on the seismograph. The continued oscillating movement of an earthquake is almost absent in the case of the local shock. The shock is more of a sudden jerk. This is borne out by the seismograph records, where the pen often jumps along the paper instead of making a continuous trail, as with an earthquake. The duration of an earthquake is also much longer, the waves commencing small, gradually increasing, and then decreasing in amplitude. With a local shock, although of smaller amplitude, the rate of movement is much more rapid, and therefore it is more noticeable to people in Johannesburg. There have been several cases where distant earthquakes have occurred which have been recorded on the seismograph with much larger amplitude than those of the local shocks, yet these have not been perceptible in Johannesburg.

20. *Origin of Shocks is not far away.*—From the fact that practically the whole of the reports of shocks experienced by people in Johannesburg originate in a comparatively small section of the Central Witwatersrand, and that similar shocks appear to be unknown in places such as Pretoria and Potchefstroom, which lie away from the reef, it is perfectly clear that the origin of the shocks must be somewhere close at hand. The character of the seismograph records corroborates this conclusion. In an earthquake situated at a remote distance, any single vibration is, for various reasons which need not be detailed, drawn out into a train of waves and is recorded as such by the instrument. If the focus of origin is close by, this does not happen, and the record merely shows one main oscillation preceded or followed by very slight quivers, which are mainly due to causes inherent in the instrument itself. The records of local shocks are invariably of this latter character.

21. *Direction of Shocks.*—No clear evidence was given as to the direction from which the shock, as felt at various points, came. Most observers reported that the occurrence was of too sudden a nature to assign any direction to it. In regard to the evidence of the seismograph, although it is possible to determine the direction of a distant earthquake, the movement in the case of a local shock is generally of too small an amplitude and of too short a duration to enable direction to be determined from the records.

TREMORS ELSEWHERE.

22. *Tremors Elsewhere in Union.*—The general question of the occurrence and distribution of seismic phenomena over the Union of South Africa has been dealt with by Mr. H. E. Wood in a paper entitled "On the Occurrence of Earthquakes in South Africa," and published in the Bulletin of the Seismological Society of America, Vol. III., September, 1913.

In this paper the conclusion is drawn that South Africa is, on the whole, extremely stable from a seismological point of view, but that there are within it a few distinct regions of minor instability in which earth tremors are experienced, and occasionally earthquakes of moderate severity. These regions are the southern part of the Orange Free State along the Cape border, the Rustenburg and Zoutpansberg Districts of the Transvaal, parts of Swaziland and Zululand, and the vicinity of Capetown. Thus during the last ten years there have been several earthquakes, widely felt over South Africa, which have had their centres of greatest intensity in the southern portion of the Orange Free State. The most notable of these occurred on 20th February, 1912. This earthquake did considerable damage in the district south of Koffyfontein, many farm buildings being completely wrecked, and as far away from the centre of the shock as the town of Kimberley, cracks were formed in the walls of buildings. It is worthy of note that this region lies near and includes part of the chief diamond-bearing region of South Africa, but there is no connection between the actual mining and the seismic disturbances. Although no intense shocks have been reported from the Rustenburg District, subterranean rumbling noises of almost daily occurrence have been heard for several years. This is an almost purely agricultural district, with no mining. Both the personal narratives and instrumental records, when obtained, of seismic disturbances in other parts of South Africa, show that these disturbances are of an entirely different class from the Witwatersrand tremors. In all accounts and records of the former it is evident that a large area of the earth's surface has undergone an oscillation which has been maintained for some length of time, but the Witwatersrand tremor has been practically instantaneous, as though a single wave had travelled outwards from a point in the near vicinity.

23. *Tremors may Occur Without Mining.*—In some places where tremors were previously unknown, they have started, continued for years, and then ceased. The best known example of this class is at the village of Comrie, in Perthshire, Scotland. Tremors were first noticed about 1800, and about 1840 attracted much attention, as even light tremors are very rare in Great Britain. An earthquake-house was erected at Comrie, and until about 1880 about three or four tremors a year were recorded, and were faithfully reported in the daily Press. These tremors have now virtually ceased, and the earthquake-house has been neglected for years. There is no underground mining at or near Comrie. It is therefore undeniable that tremors can be experienced as in the Rooiberg, and at Comrie, without any mining. It is also evident that a quiet region can be invaded for a time by tremors, which, after a succession of years, may cease. About Comrie, the country consists of shales, greywackes, and igneous rocks with radiolarian cherts and black shales.

(To be continued.)

WRIGHT'S ROPES.

WANTED.—Antimony Mine; state location, character and quantity of ores and full particulars. Address Manufacturer, Station C, New York, U.S.A.

RAND METALLURGICAL PRACTICE.—IV.

Discussion of Mr. F. L. Bosqui's Paper—Views of Rand Metallurgists.

THE following is the continuation of Dr. Caldecott's contribution on Mr. Bosqui's paper:—

EXPERIMENTAL work in this direction has been carried out by graduate students in my laboratory and I understand that their work is being extended on one of the mines. I am certainly hopeful of the results.

Breaking and Sorting.—Sorting and breaking are commonly done at the shaft head in the "crusher station," and the broken ore is then transported to the mill, either in hopper-bottom cars, often of full railroad size, drawn by steam or electric locomotives running over the battery bins, or alternatively conveying and elevating belts are used. The non-crystallization of design into some standard method is partly explained by the difference in the amounts of waste sorted out at different mines, which in turn depends considerably upon the variation in thickness and dip of the reefs. This variation affects the relative amounts of rock broken by machines or hammer boys and hence the amount of waste mined. Undoubtedly the use of circular sorting tables in buildings with several superposed floors gives rise to crowding in a breaker station; while with belts the building is spread out over much more ground space, there is more room available, and better lighting is possible, which is in favour of the employment of belts. I must confess to a feeling of preference for jaw breakers as opposed to gyratory crushers, mainly on the ground of greater ease in clearing after a choke or sudden stoppage, and of renewal, replacement, or repair. Mr. Bosqui does not give the size to which the ore is broken for stamp milling, and although about 2 in. is aimed at, the feed in most cases is actually nearer 4 in. Jaw breakers for this size are satisfactory and the larger size is apparently of no moment with modern heavy stamps.

Stamp Milling.—Here the Rand has little to reproach itself with on the score of conservatism. The figures given relative to the superior performance of Nissen stamps appear to be conclusive.

Amalgamation.—Mr. Bosqui appears to cavil at the extreme to which reduction in the number of tube-mill plates has been carried on the Goldfields group. This of course is accompanied by efficient classification so that such portion of the pulp as is bypassed to the cyanide plant will only carry a little free gold and that in a finely divided state; so that in the first place it would only be amalgamated with difficulty on account of its slow settlement and in the second it is easily soluble in cyanide. It is commonly stated that gold amalgamated represents 100 per cent. extraction, while if it gets to the cyanide plant only 90 per cent. can be recovered, and this is one of the half-truths so difficult to controvert. The residue from cyaniding contains gold partly undissolved (because incased, etc.) and partly as dissolved gold which has not been washed out, the former being much the more important in amount. The finely divided free gold referred to, which presumably might have been amalgamated, will presumably also be completely dissolved in cyanide and nearly all, not 90 per cent. only, removed and recovered; the value in the residue is mainly due, as stated, to incased gold which could not have been amalgamated either. There is, of course, no need to point this out to the author, but it may not be obvious to some of his readers. Practically all the free gold which would be able to settle in the stream of pulp passing over the plates and so become amalgamated, settles in the classifier and therefore gets on to the plate, as is shown by the very small difference in recovery when bypassing and using few plates, or when using the alternative practice, in each case under good conditions. In connection with the trials at Modder B., we are not told whether any pulp was bypassed and I suggest that the appearance of free gold in the residue indicated merely overcrowding of the plates with pulp and that a cure might have been found in bypassing some, or more, of the pulp—the carefully classified finer or lighter portion, of course—and should like to know whether this was tried. This view obtains support, I think, from the fact that overcrowding of the full 30 plates also led to the appearance of fine gold in the residue.

Tube Milling.—Mr. Bosqui on p. 20 refers to the broken quartz necessary to maintain the pebble load. I merely mention this as it might give a wrong impression—it should, of course, read, ore or banket. With regard to peripheral discharge, similar experiments to those instanced at the City Deep have been in progress elsewhere and the results are given by Mr. Dowltig. As a result the wide adoption of scoop discharges seems to be foreshadowed, but will necessitate the provision of increased power. Mr. White has also put on record before the same Society results of experimental work with a short section of a tube mill of variable diameter, which I had the pleasure of superintending. In the case of the tube mill with ball mill end described, it would seem that the fact that partitioning off the end of the mill in that manner entails no decrease in efficiency constitutes an argument in favour of the view that the length of mills might be lessened. The few balls would have little action on the already fine pulp, certainly much less than the usual charge of pebbles; their action would be practically confined to the small pebbles to be crushed.

Classification.—The author's conception of the mode of action of a diaphragm classifying cone appears to be quite exceptional and I hesitate to accept it. I should like to ask whether he has any evidence that the outer portion of the settled sand is crowded upward? The central portion is certainly coarser and therefore heavier so far as the weight of individual particles is concerned; but I have often noticed that the outer and finer portion appears to be much richer in pyrite and consequently the specific gravity may be even higher than in the centre. Unfortunately, I have no figures available. My impression of the mode of action is that the concave shape of the top surface is determined by the fact that the disturbance at the central feed is too great to allow any but the very coarsest pieces to settle; as the pulp flows out toward the periphery the velocity decreases so that more and more sand of successively finer grade settles out, the feed being so regulated that only particles sufficiently fine reach and are carried over the edge, but that all the settled sand is slowly settling toward the outlet. The coarse centre tends to move faster than the sides and this would lead to "break-aways" if it were not checked by the diaphragm which serves both to take pressure off the outlet and to mix the sand in passing by its edge. The separation of sand and slime is more difficult than the preparation of tube-mill feed, as the particles are more nearly equal in size. Where the same kind of cones are used, the underflow (sand) is considerably contaminated with slime, and is diluted with wash-water and reclassified, using in each case a thick underflow; or else, as the author describes, a separate clean water service is fed to the bottom of the cone, inside, which prevents slime issuing with the underflow sand—washes it, in fact—but then uses a thin discharge; in either case the final sand contains very little slime, and it therefore becomes possible to add the required lime in the battery as the difficulty of premature slime settlement in sand is thus obviated.

Treatment of Sand.—There must be few plants operating as described under method 1. It is usual, where hose filling is used, to pass the mill pulp through spitzkasten or spitzlutten, and convey the spitz underflow, still containing much slime, to the collectors through hose. It might be mentioned, too, that at some plants a considerable proportion of the residue is disposed of by sending it immediately underground for stope filling. In connection with the filter-table method of sand collection, the sand is ploughed off into cyanide solution and then pumped to collecting vats via Butters' distributors; it is consequently agitated and collected in cyanide solution.

(To be continued.)

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

State Mines and the Government.

To the Editor, *South African Mining Journal.*

Sir,—In your issue of 12th inst (page 552), when commenting on an article which appeared in *The Statist re* Government Gold Mining Areas, you state:—"If 6s. 6d. is the profit on a recovery of 25s., it is equal to 26 per cent. of it, and according to the terms of the contract the Treasury would be entitled to 26 plus 10 per cent., or 36 per cent. of the profit," etc., etc. Assuming the conditions of the lease as stated by the "Mining Manual" to be correct, I think you will agree with me, on looking further into the matter, that the amount payable to the Treasury under the above circumstances would be 26 per cent. plus 10 per cent. of 26 per cent., or 28·6 per cent., not 36 per cent. of the profit.—Yours, etc.,

ALEX. HAIR.

Pietermaritzburg,
14th February, 1916.

[Our correspondent is quite right. The matter is more fully dealt with elsewhere in this issue.—Ed., *S.A.M.J.*]

Karroo Coal Controversy.

To the Editor, *South African Mining Journal.*

Sir,—In your issue of the 5th Mr. Kenneth Austin suggests that carbonaceous material may be more useful than to burn in an open fire and that the correct method of using coal is to treat it in such a way that waste gas for power purposes is obtained as a bye-product. Mr. Austin refers to the operations of the Natal Ammonium Company as an example of how coal may be treated, but I fail to understand how the success of this company will have any bearing upon the value or otherwise of hydrocarbon minerals of vein formation. So far as the writer is aware, the material found in the Karroo contains practically no volatile matter and falls to a powder on application of a moderate heat. It appears to be very different chemically and physically from any hydrocarbon mineral from which tar, benzol, ammonium sulphate, cyanogen, or other coal products are being successfully extracted. What valuable bye-products does Mr. Austin hope to see obtained from hydrocarbon minerals, which contain no volatile matter such as those found in veins in the Karroo? I quite agree with the remarks of your correspondents on the desirability of establishing further industries in South Africa, and would use my efforts in that direction, but in a country where there is much misdirected energy it seems well to call attention to features in Karroo mining prospects which appear to be in danger of being overlooked. If coal of excellent quality exists within a few hundred miles of Capetown there should be no difficulty in disposing of it for use in open fires and for the generation of steam. Although this may not be the correct way of dealing with it according to Mr. Austin, I doubt if any of your readers will live to see the last of the steam engines relegated to the scrap heap or consigned to a museum of engineering antiquities. Mr. Austin says that it is rather late to ask such questions as have been put to Mr. Chambers, but as the latter has brought forward some quite original theories regarding the origin of coal, I trust that he will make public a few facts upon which those theories are based.—Yours, etc.,

STANLEY NETTLETON.

Mr. A. L. Chambers' Rejoinder.

To the Editor, *South African Mining Journal.*

Sir,—With regard to a letter by Mr. Stanley Nettleton, appearing in your issue of January 29th, I would not again trespass on the valuable space in your paper were it not that the subject is of so much interest and of such vital importance to South Africa. To those who read and think, the question as to the future of the young generation of South Africans growing up around us is one of absorbing interest, and to them the question very naturally arises, what industries can be organised for their maintenance, and what natural resources can be exploited to feed these industries, create exports, induce commerce with other ports of the Empire, and the world in general, and at the same time render this South Africa of ours a prosperous, thriving country, taking its place as an integral part of the Empire in such a manner as to make our children proud to say "I am a South African."

We have, to-day, a very large percentage of the world's shipping passing via the Cape route, and we are told that capital is being provided to organise regular steamship services from United States via South American ports to South Africa. Those ships require coal (or fuel), which they can only obtain by going round the coast to Durban or Delagoa Bay. Not only that, but a large coal trade could be done with South America. To supply this demand, the person who reads must know and realise that the South African railways cannot meet the demand for delivering the coal to the various ports. To carry sufficient coal by rail to Capetown to meet the coming demands is impossible, and the demand for ships is such as to make that means also impossible.

In the Cape Colony or Western Province to-day there is labour for which there is no employment. There are industries which could be started and natural resources utilised, but they require power, cheap power, which they have not the means to develop. Therefore, what does coal mean within about 230 miles of Capetown? Should not every possible encouragement be given to develop this resource rather than adversely criticise it? With regard to Mr. Nettleton's query, "What is coal?" I think the best answer to him is to quote the analysis of the substance called Welsh coal, accepted as the standard by the coal testing committee of Natal, October, 1914, to May, 1915, for the comparison of the substance in Natal called coal, which is as follows:—

	Moisture	Volatile Hydrocarb.	Fixed Carbon	Sulphur.	Ash.	Specific Gravity.	Calorific Power.
Welsh Coal .	0.85	15.79	79.13	1.12	3.50	1.296	15.08

As a comparison I give the analysis of two samples made by Mr. Andrew F. Crosse, M.Inst.M.M., of Johannesburg, and the average of six samples made by the Government Analyst, Capetown; these samples taken from various points where coal was exposed over an area of about 20 miles by 10.

	Moisture.	Volatile Hydrocarb.	Fixed Carbon.	Sulphur.	Ash.	Specific. Gravity.	Calorifi Value.
Sample A ...	1.00	4.70	91.98	0.27	2.05	1.38	14.96
Sample B ...	1.00	5.25	86.64	0.27	6.84	1.48	14.50

Remarks.—Ash brown, flame scarcely visible, non-smoking and non-coking.

	Moisture.	Volatile Hydrocarb.	Fixed Carbon.	Sulphur.	Ash.	Calorifi Value.
Average of six samples	3.008	8.66	77.55	1.28	10.57	13.483

Perhaps by comparison, your readers will be able to judge whether I am justified in calling this a coal or not. If the substance under discussion were grahamite, manjak, gilsonite, wurtzilite, albertite, impsonite, nigrite, or, to put it briefly, native bitumen, or if it were derived from shales containing quantities of volatile hydrocarbons by means of distillation as suggested by Mr. Nettleton, then the substance so derived would have penetrated and filled all fissures irrespective of strike, dip or angle, and would have permeated the rock walls of the fissure. In this case, however, the coal is found only in one type of fissuring which has a defined and definite line of strike, thus conveying the impression that these coal-filled fissures are due to certain series of earth movements, the formation on one side of the fissure being raised 6 to 7 feet above the other. The fissure walls are generally clean as though cut with a knife, while the rock on the side of the fissure in contact with the coal is often indurated. The only instance where penetration of the coal into the rock has taken place, is at such points where the fissures have broken irregularly and abutting rocks into the line of fissure have become fractured. The foregoing illustrates the general characteristics of the fissures; but in one instance the fissure was found to contain between irregular, unaltered walls a filling of coal in lumps varying in size from small pieces up to lumps about 6ft. in diameter mixed with broken rock.

In the case of bitumen the original liquid character is proved by the occasional occurrence of pieces of unworn "country" rock embedded in the vein; but in the instance under review all included pieces of rock are much worn and rounded, while the evidence of forcing up of a substance not in liquid form is clearly demonstrated by lines in the coal in appearance like lines of schistosity or stratafication; also by the upward tilting of the strata near the surface. For the benefit of those interested, and the better to answer Mr. Nettleton's question, I quote an extract from Professor A. Beeby Thompson's book on petroleum mining, which is as follows: "The solid native bitumens are distinguishable from coal, which some closely resemble in appearance, by becoming viscous or fluid on the application of heat, and by their solubility in solvents, such as carbon bisulphide, chloroform, petroleum spirit, etc. Most native bitumens are also soluble in crude petroleum or heavy natural oil, sometimes called Maltha. The superior quality bitumens mined in Syria, Barbados and Utah never occur in wide veins, and it is the less valuable materials known as grahamites, albertite and wurtzilite that are often discovered in veins many feet wide. On heating these latter they do not melt but intumesce, and the constituent hydrocarbons are dissociated with the production of gas, a residue of carbon resulting, if the heat is continued; but if heated with a portion of heavy oil, in which they dissolve, disintegration is avoided and a homogeneous product is produced." And I may say that the material under discussion will not respond to these tests.

Further, in reply to Mr. Nettleton's questions, I may say that on the property all the blacksmith's work is done by using it in the forge, all the food is cooked by using it in the stove, and by means of lengthening the funnel in order to increase the draft it is used in the boiler. It gives an intense heat, and is absolutely free from smoke. Therefore, in the face of all this evidence, I would say to all those who call themselves South Africans: Think of the future of your country and the future of your children before you entertain criticism of your country's possible resources, because they do not absolutely conform to the letter to exactly what your grandfathers worked.—I, am, etc.,

ARTHUR L. CHAMBERS.

PERSONAL.

His many friends will be glad to hear that Mr. R. N. Kotze, the Government Mining Engineer, is making a rapid recovery after his recent severe operation.

* * * *

Mr. Otto Jeppe, nephew of Mr. Julius Jeppe, has been severely wounded in the fighting in East Africa.

* * * *

Major U. P. Swinburne, of the Mines Department, has now recovered from his wounds, but has been unable to pass the Medical Board as fit to return to the Front.

* * * *

The large number of mine officials at present attending Professor Yates' lectures has led to some unavoidable temporary inconvenience as regards accommodation. The necessary new arrangements have now been completed and will doubtless meet all likely demands for some time to come. A feature of the overseers' lectures is that they are delivered in duplicate for the convenience of men who work day and night shift alternately; and this provision is greatly appreciated.

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THE WEEK IN THE SHAREMARKET.

Steady with Less Business—Favourites Quieter—Good Undertone.

ALTHOUGH business has been less brisk this week and the favourite stocks have been allowed to ease off a little, the undertone remains good. Some fear of Paris selling under the new relaxed regulations seems to be at the bottom of the inactivity of the week, but this fear seems to be passing. The general market position is undoubtedly a strong one. Recent buying on this side has been of a sound investment nature, and the outlook for the industry, given a continuance of the present favourable labour conditions, remains excellent. Tin stocks have been a little better, on the increasing price of the metal, and diamonds have been enquired about, in view of the slightly improved prospects for the product.

Writing of Daggafonteins, a London market correspondent says:—"It was calculated that the three years' option certificates which it is proposed to issue in connection with the reorganisation should be worth 5s. apiece, but we do not know whether any dealings—which would, of course, have to be of an informal character at present—actually took place in them. As regards the options on shares in the new Daggafontein Company which are to be given to the old Daggafontein Company, there was considerable dispute in the market as to whether they will be passed direct to shareholders. On the face of the official documents it does not seem that any other course could reasonably be taken, but sufficient doubt apparently exists on the subject even in quarters which should be well informed for it to be desirable that a definite official statement on the point should be made at the earliest possible moment. Assuming this statement is satisfactory market opinion would seem to be almost, if not quite, unanimous that the Daggafontein scheme is the fairest and most generous that has been put before any body of Kaffir shareholders for years past."

	Friday. 11th.	Sat. 12th.	Mon. 14th.	Tues. 15th.	Wed. 16th.	Thurs. 17th.
Apex Mines . . .	5 0*	5 3	5 0*	5 3*	5 6*	5 6*
Aurora Wests . . .	9 9*	10 0*	10 0*	10 3*	10 6*	10 3*
Apex Mines	9 9*	10 0*	10 0*	10 3*	10 6*	10 3*
Bantjes Cons. . . .	11 9A	14 3	13 9	13 4½	13 3	13 0
Brakpan Mines . . .	—	72 6	—	71 0*	73 6†	71 0
Breyten Collieries . .	—	19 0*	19 0*	19 0*	—	—
Brick and Potteries	—	—	5 0*	5 0*	5 0*	—
Bushveld Tins . . .	—	0 6	0 6*	0 7*	0 9	0 9*
Cassel Coals	—	19 6†	—	19 6†	—	19 0†
Cinderella Cons. . .	5 0*	5 9	6 0	6 0*	6 3	6 0*
City and Suburbans	35 6	36 0	35 6*	35 9*	36 0†	34 6*
City Deeps	73 0*	73 0	72 0*	72 6*	73 0	71 0*
Cloverfield Mines .	7 9	7 9	7 6*	7 9*	7 9	7 6*
Clydesdale Collieries	—	11 6*	—	14 6	—	14 0*
Con. Gold Fields . .	—	—	—	27 6†	—	—
Con. Langlaagtes. .	33 6†	33 6†	—	33 6†	30 0*	33 0†
Con. Main Reefs. .	19 0*	19 0*	19 9*	19 6†	19 6†	19 3†
Con. Mines Selection	14 6†	—	—	14 0*	14 0*	14 0*
Coronation Collieries	25 6*	25 6*	25 6*	25 6*	25 6*	26 0*
Coronation Freeholds	0 3*	0 5	0 3*	0 3*	0 3*	0 3*
Coronation Synd.. .	2 0*	2 3*	2 3*	—	—	2 6*
Crown Diamonds, .	1 9*	—	2 0*	—	2 0*	—
Crown Mines Deb.	£100†	—	—	—	£100†	£100†
Durban Rood. Deeps	15 0†	—	—	—	—	—
East Rand Centrals.	4 4	4 4	4 6	5 0	5 1	5 1
East Rand Coals . .	2 9	2 11*	2 11	2 10*	2 10	2 10*
East Rand Deeps . .	1 9	1 8*	1 7*	1 7*	1 7*	1 7*
East Rand Minings	—	12 6	12 3†	12 6†	12 6†	—
East Rand Props. .	18 9*	18 9*	18 9*	18 9*	18 9*	18 6*
E R. Debentures . .	£77½*	£77½*	£77½*	£77½*	£77½*	£77½*
Eastern Golds	1 7*	1 7*	1 9†	—	1 4*	1 3*
Ferreira Deeps . . .	—	—	—	38 9†	—	—
Frank Smith Dmds.	2 2*	2 3	2 1	2 3	2 4*	2 6*
Geduld Props. . . .	36 6	36 6	36 6	36 3*	36 3*	36 6*
Glencairns	—	—	—	—	2 0*	2 0*
Glynn's Lydenburgs	—	—	—	8 0*	8 0*	8 0*
Glencoe Collieries . .	—	—	—	—	7 6*	6 0*
Govt. Areas	30 9	30 9	31 3	31 6	31 3	31 3
Jupiters	7 7*	7 7*	7 6*	7 0*	7 0*	7 0*
Kaalfonteins. . . .	—	—	—	—	—	0 3†
Klerksdorp Props. .	1 9*	1 9*	2 0†	1 9*	1 10	1 9*
Knight Centrals . .	16 7†	16 8	16 11	17 1	16 9	16 8
Knights Deeps . .	—	—	22 6†	21 0*	21 0*	21 0*
Lace Props.	4 9	—	4 9*	—	—	5 2†
Langlaagte Estates .	—	—	—	—	—	17 0†
Luipaardsvlei Estates	8 6†	—	—	9 0†	—	7 0*
Lydenburg Farms .	8 10*	9 0	8 8	8 9	8 5	8 3
Main Reef Wests .	9 3*	9 9	9 6	9 0	9 0	8 9
May Consolidated .	—	—	—	—	—	7 0*
Meyer and Charltons	100 0*	100 0*	—	100 0*	100 0*	100 0*
Middelvlei Estates .	1 3*	1 3*	1 3*	1 3*	1 3*	1 3*
Modder B.'s	115 0	114 0*	—	114 6*	—	114 6*
Modder Deeps	115 0	114 0*	114 6*	114 6*	113 6*	113 6*
Natal Navig. Col. .	—	—	—	16 6*	—	—
National Banks . . .	—	—	—	—	205 0*	210 0*
New Boksburgs . . .	2 0*	2 0*	2 0*	2 0†	—	2 0†
New Eland Diamds.	14 0†	14 0†	—	—	13 0†	9 0*
New Era Cons. . .	7 6*	7 7*	7 7*	7 7	7 8	7 7*
New Geduld Deeps.	3 8*	3 8*	3 8*	3 9*	3 11	3 10
New Gochs	—	10 9*	—	—	—	10 9*
New Heriots . . .	53 6*	53 0*	52 6*	52 6*	—	—
New Kleinfonteins	28 3	28 3	28 6	28 6*	29 6A	29 3
New Modderfonteins	302 6*	305 0†	302 6*	305 0B	—	—
New Rietfonteins. .	—	—	—	1 0†	—	1 3†
New Unifieds . . .	13 0†	11 0*	11 0*	13 0†	—	12 0*
Nigels	7 0*	—	7 0*	8 0†	—	7 0*
Nourse Mines . . .	13 0*	—	14 6*	15 0*	15 0*	—
Pot. Explorations .	—	—	—	0 6*	—	0 6*
Pretoria Cements .	59 0*	59 0	59 0A	59 0*	59 6*	60 0
Princess Estates . .	—	—	—	3 3*	3 9†	—
Rand Collieries . . .	—	3 3*	3 10*	—	4 0†	3 6*
Rand Klips	6 7*	6 6	6 5	6 4*	6 4*	6 4
Rand Nucleus . . .	1 9*	1 10*	1 11	1 10*	1 11	1 10*
Randfontein Deeps.	3 9	3 11	4 3	4 3	4 3*	4 0*
Randfontein Est. . .	11 0*	11 0*	11 9	—	12 0†	—
Roberts Victors . .	8 9*	9 0*	9 6*	10 0	—	10 0*
Rooibergs	13 0	13 0	13 0	13 0	12 6*	12 6*
Roodepoort Uniteds.	8 0*	8 3	8 0*	8 6†	8 0†	8 0†
Ryan Nigels	2 3*	2 3*	3 6†	3 6†	3 6†	—
Shebas	1 6*	2 0	2 1*	2 3*	2 3*	2 3*
Simmer Deeps . . .	1 9*	—	2 0*	2 0*	2 0*	2 0*
S.A. Lands	3 10*	3 11	4 0	3 11*	3 11	3 11
Springs Mines . .	42 0*	42 9	42 9	43 0	42 9	42 6
Sub-Nigels	11 3*	11 0B	11 3*	11 9	11 9	11 9*
Swaziland Tins. . .	—	—	20 0*	20 0*	—	—
Trans. and Delagoa	—	—	—	52 6†	—	—
Trans. Coal Trusts.	—	53 6	53 0*	53 6*	53 6*	54 0
Transvaal Lands . .	13 0*	13 0*	13 0*	14 0†	14 0†	—
Tarns. G.M. Estates	24 0*	24 0*	24 0*	—	26 3†	26 3†
Tudors	2 0†	2 0†	—	—	—	—
Van Dyks	—	3 3†	2 9*	—	3 6†	3 6†
Van Ryn Deeps . .	59 0A	58 6	58 6*	58 6*	58 9*	58 0*
Van Ryn Estates .	45 0*	45 0*	—	43 6*	43 0*	43 6*
Village Deeps . . .	—	36 0†	—	—	—	36 0†
Vogel Con Deeps .	1 9*	2 1	2 2	2 0A	2 0*	2 0
Welgedachts	20 0*	20 0*	21 0†	—	20 0†	—
Western Rand Cons.	1 0*	—	1 0*	1 0*	1 0*	1 0*
Witbank Collieries .	—	41 6*	43 0*	—	—	42 6*
Witwatersrands . .	52 6	53 6†	53 6†	53 6†	53 6†	52 6*
Wit. Deeps	23 3*	22 6*	22 6*	23 0	22 6*	22 6*
Wolhuters	10 3*	10 6*	10 6*	10 6*	10 6	10 3*
Zaaiplaats Tins . .	11 0	12 0	12 3	12 0†	10 6	11 6

* Buyers. † Sellers. A Odd lots.

* Buyers. † Sellers. A Odd lots.

ANSWERS TO CORRESPONDENTS.

All inquiries addressed to the Editor must bear the writer's name and full address. We cannot reply to inquiries by letter, but telegrams with replies prepaid will be answered. Correspondents are requested to write their names and pseudonyms distinctly.

"Shareholder."—Another letter on the matter is printed in this issue, and the error is rectified.

"Luipaardsvlei."—We thought the practice of cabling news to London and ignoring local shareholders was at an end. Enquiries are being made.

"Far East."—With present-day pumping facilities, the water trouble should be but temporary, and then a big future may be predicted for the property.

"City."—General market conditions appear to be the sole reason. On results and prospects the shares are worth much more.

"Interested."—(1) The position is fully explained in the Chairman's speech at the last annual meeting. (2) Merely a market rumour. Nothing in it.

"B. S. Blaine" (Seapoint).—The Geduld people have ordered 40 additional stamps, which are expected to be at work towards the end of the year.

"Investor" (Forest Hill).—(1) Yes. (2) 110 stamps and 3 tube mills at work; 12½ per cent. was paid last year. The life is long and the prospects excellent.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Mines Still Quietly Buying—Prospects of Wallpapers, Oils, White Lead, Iron and Steel, also Miscellaneous Items.

Business on the Commercial Exchange is quieter, in consequence of the Mines having replenished stores after the stock-takings at the end of the year. However, it is recognised that there is not likely to be any falling off in their ordinary requisitions, as present stocks will not be allowed to decline below about a six months' consumption in hand, as the regular shipments will not right themselves for a long while to come. The recent arrival of three mails together, at least within a very short time of one another, upset our local railways owing to the unusual congestion both at the coast, and to a lesser extent in the Johannesburg deliveries of heavy and imperishable goods from the Kazerne. For example, in one quoted instance, a consignment of material cleared on February 7th had not been delivered by the 16th instant. This, however, was not mentioned as a complaint, as all local shippers are quite reconciled to the fact that deliveries cannot be so prompt under war conditions as before. It is good to know that through the simultaneous arrivals of the quick boats and the slow boats at our coast ports, that fair quantities of goods will shortly be delivered here and so prevent anything like a shortage, excepting in special lines. For instance, to supporters of South African industries, it is refreshing to hear that one at least of our iron works has stopped taking new orders to enable it to catch up with those on hand. Another little bit of welcome news is that the mines are making a point of using, for underground work, Natal and Cape pine, to assist in checking the values of Oregon timber, which, however, is coming forward very intermittently in consequence of the shipping freight question and the irregularity of sailings. There is no particular gossip on 'Change; but the list of casualties from German East is eagerly scanned to ascertain if anyone connected with the institution has met with a mishap. A very confident feeling prevails throughout the offices of the mining material merchants as the balance sheets for 1915 have been all-round satisfactory, and this year, so far, has been quite good; in fact, rather better than the average of last year at this period. Whether it is father to the wish, but one often hears very enthusiastic talk of American capital coming here to assist in ranch exploration as well as the further development of our immense mining possibilities. And it is satisfactory to know by personal investigation that our local "small" men, as compared with the mining magnates, are quietly busy.

WALLPAPERS, OILS AND COLOURS.

A leading local firm has issued a mid-monthly circular, from which is extracted as follows:—

Wallpapers.—Owing to the shipping delays, the 1916 pattern books are delayed in the issue. The first consignment is expected about the middle of March, and the balance in April.

White Lead.—The price has risen nine times during the last three months and advanced another 30s. per ton on Feb. 14th in Britain. The Johannesburg price to-day is 65s. per 100lbs., and it is thought that it will be 70s. in March.

Linseed Oil remains at the highest rate for years, and the price here to-day is 27s. 6d. per 5-gallon drum. Obviously the high values for linseed oil and white lead are affecting the price of paints and putty.

Turpentine.—The price to-day is 52s. 6d., per 2-5 gallon case, and 57s. 6d. for 10-1 gallons. It is expected that these will remain stationary for a month.

Muralo and Calcite.—Owing to the increased freights from America, the prices have been raised: Calcite 20s. and Muralo 18s. 6d. per case of 8 packets each.

THE IRON AND STEEL TRADE.

The recent arrivals of iron and steel from Oversea have been welcomed and, although values remain much the same, the tendency is towards higher rates, particularly during next month. Even next week there may be an advance on hardware goods in bolts, nuts and similar goods. Muntz metal and naval bronze are very scarce, and 4lb. hammers are practically unprocurable, although a small lot changed hands at 9d. per lb., as compared with 4d. before the war period. All kinds of battery spares, machinery sundries and almost all material actually on the water or at the coast, is being readily sold to arrive. There is a vein of uncertainty about obtaining goods from Oversea, but the confident feeling generally pervading everything overshadows anything like a pessimistic mood in mining material circles.

MISCELLANEOUS ITEMS.

Electrical material is being more rapidly absorbed than the arrivals to fill up. Timber and all building materials are much the same, but the demand is quite steady, in fact, surprise is often expressed that things are so good in that direction. The second-hand material trade is erratic, the features are the demand for pipes, rails and tram trucks, with an occasional enquiry from the northern Transvaal and Southern Rhodesia for small batteries.

REVISED PRICE LIST.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, bar 20s., 22s. 6d. and 25s. (local do., 15s. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 3d. lb.; drill, 5¼d. lb., tool, 7½d. to 9d. lb.; steel plates, 10ft. x 4ft. x 1-16in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 8d. per lb.; over 3 in., 7d. lb.; ½ in. up to 2½ in., 45s.; 2¼ in. to 6 in., 42s. 6d.; 6½ in. and over, 40s.; ⅝ in. up to 2½ in., 37s. 6d.; 2¾ in. to 6 in., 35s.; 6½ in. and up, 32s. 6d.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 32s. 6d.; 2¾ in. to 6 in., 30s.; 6½ in. and up, 29s. per 100 lbs. Nuts, ⅜ in., 9d. lb.; ½ in., 50s.; ⅝ in. to 1½ in., 47s. 6d.; 1⅝ in. to 1¾ in., 52s. 6d. per 100 lbs.; 2 in., 7½d. per lb.; washers,

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Electrical Goods: Lamps, high volts., British, Holland & American, 14s. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 9d. per yard; 3/20 coils of wire, 27s.; do., 3/22, 23s.; tubing, 12s. to 13s. 100 ft.; keyholders, 2s. 6d. each; round blocks, 3½ in., 3s. 6d. doz., local; lamp holder cord grips, 12s. doz.; switches, 5 amp., 12s. to 13s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 10s. to 15s. 100; cleats, 18s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £30 new.

Review.

"The Metallurgy of Gold." By Sir Thomas Kirke Rose, D.Sc., President of the Institution of Mining and Metallurgy, Hon. Member of the Chemical, Metallurgical and Mining Society of South Africa, etc. Sixth Edition, published by Charles Griffin and Co., London. Price, 22s. 6d. net. Progress in metallurgy depends on the capacity of metallurgists to apply in a practical manner such discoveries in the chemical, physical and mechanical sciences as may be brought to bear upon the ever-living problem of extracting the greatest possible profit from the ores with which they have to deal. It is, therefore, essential that students of this the oldest science in the world, should have, in a readily accessible form, a record of all the available data so far obtained. To be of the greatest value such records must be prepared by those having intimate practical acquaintance with the particular metals discussed, and few people in the whole world can have such great facilities for dealing with the subject of gold as the chemist and assayer of the Royal Mint in London. It has, therefore, long been recognised by both students and practical workers that "The Metallurgy of Gold," by Dr. Kirke Rose, is the most valuable work of reference on this metal, and it may at once be affirmed that this, the sixth edition, is as great an advance upon its predecessors as the progress of the science warrants. Two distinct features call for special comment: In the first place there is a very noticeable absence of the familiar half-untrue and wholly misleading statements of indifferent experimenters, fancies of pure theorists, or beliefs of untrained minds, and in their place we have critical examination of good work checked by the author's own experiments where possible. The other distinctly valuable feature, referring particularly to extraction methods in various parts of the world, is the obvious care which has been taken to obtain first hand information and the greater amount of attention which is paid to principles underlying practice than to the mere mechanical details of machines employed. The metallurgical practice on the Witwatersrand, where we are best able to compare the descriptions with the facts, is handled in a masterly manner, and is illustrated in a generous fashion both by diagrams and some excellent photographs, for which as well as for some considerable amount of information the author makes acknowledgment to Dr. Caldecott, and to the authors of Rand Metallurgical Practice. In every branch of the subject considerable historical information is supplied and it is distinctly curious to note how the most modern practice tends to repeat the methods of the most ancient known, in the matter of coarse crushing as a first stage followed by very fine grinding as a preliminary to extraction of gold. The attention of our Government mining department and of progressive legislators is called to the complete and up-to-date account of the various methods in use in the mints of the world for preparation of fine gold, and in especial to the simple and efficient methods of electrolytic refinement, and in passing it might be mentioned that it is difficult to explain why the whole of the Rand gold should not be refined in Johannesburg and the pure metals only shipped. As is usual in the volumes of this series, the letterpress is clear, and the illustrations excellent, and fair freedom from printer's errors may be noted, though on page 343 an unfortunate slip is responsible for the statement that cyanate of potassium is a gold solvent.

H. A. W.

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Engineering Notes and News.

LOCAL MANUFACTURE OF BEARING METAL.

Anti-friction or bearing metals have an important position in mining mechanical requirements. The use of lead or tin base linings to prevent friction and reduce wear in moving machine parts is comparatively modern; but their employment is now of such a general nature that a note on the subject should be of interest to engineer readers. We had pleasure recently in following a spirited controversy on the subject of bearing metal in the columns of a leading engineering journal. One side declared for a single alloy to be suited to every known purpose—a universal metal. The other took the view that each mechanical case should be treated according to its special features, resulting in the employment of varying alloys to suit the different conditions. The supporters of variety had the better of the argument, which ranged over all conditions of motive power, from a buzz-fan to a battleship. A metal which is recommended as equally fitted for slow or quick speed, for light, heavy or extraordinary loads must, we think, be looked upon with a care amounting to suspicion, as no single alloy can be wholly adapted to the diverse mechanical conditions of these fields. One cannot conceive a similarity in running service as, say, between a small electric motor at 1,500 revolutions per minute and a 15 inch turbine shaft moving at 250. In the former case the lining metal is asked to resist excessive possible friction under a light shaft load. Here a high melting point with reasonable wearing properties in the bearing are essential. In the case of the turbine the main requirement is not so much resistance to friction as to the "squeeze" of shaft pressure, a service which can be performed only by the highest grades of hard, tough metal. The so-called universal alloys are usually lead-base with an excess of antimony to raise the melting point. Such a bearing would give fair satisfaction in the motor; but it would be entirely unserviceable in the turbine. The reason is a simple one. Lead, being a natural lubricant, is the best antifriction metal in the world; but it will not admit of hardening in alloy sufficiently to "stand up" to extraordinary loads without squeezing or setting up friction. If the hardening constituent—usually antimony—is used in such a degree as to make an ill-balanced mixture, then friction, instead of being allayed, is induced, resulting in the bearing running out or the stripping of the shaft. The higher grades of bearing metals are composed of tin, copper and antimony in proportions varying with the service requirements. Lead, if present, is in small percentage only. Nickel is often used to replace a portion of the copper usually on the ground of its higher tensile strength. No extra benefit is derived from its use as it will alloy perfectly only if added in small proportion. Owing to its wide use in bearing and other metals, antimony is of special interest. War requirements have taken the price per ton from £30 to £100, the latter figure being now fixed for purposes of War Office contracts. Outside consumers, however, have to pay currently as much as £160. It is the most suitable hardener of lead, with which metal it alloys perfectly. At present the largest consumption is in the manufacture of shrapnel bullets. The Russian War Office still favours the ordinary lead cartridge bullet, antimony hardened, and large quantities of the metal go to our Ally in the East. Local users of bearing metals require to have a good deal of confidence in the brands they are using, especially in mining machinery. A mistaken choice or a reduction in the quality of a brand already in use may entail heavy losses. A unit is hung up with loss of productive time and the expense of replacement. Bearing metal is essentially a commodity of trust and confidence, especially in these days when there are thrown upon the market so many different brands with a similar appearance confusing to all but the most expert. The only reliable test is of course the service test. Mechanical tests of the laboratory type have very little practical significance. One of the first firms in South Africa to manufacture a range of bearing alloys for all purposes was Messrs. Alex. Knox of this city. At their works at 246, Fox Street, considerable time and effort have been spent in preliminary work; and the business has grown with gradually acquired experience. The firm now produces the well-known Knoxite brand of bearing and anti-friction metals covering all possible machinery requirements. We have had the opportunity of visiting the works and have seen the manufacture of various alloys in operation. Careful attention is given to each detail of work: the weighing of the virgin metals in their specified quantities, melting and pouring at studied temperatures, water-cooling of ingots to ensure complete alloying of constituents. In all the firm turns out six different grades of

Water-Cooling the Ingots.

alloys, ranging from the requirements of large turbines, jaw or gyratory crushers, cam shaft and tube mill bearings, trucks, skips, high or low speed motors to motor car bearings; and the output has a radius of delivery extending to the Belgian Congo. The works also turn out non-ferrous alloys in ingot form to any ordered specification. The photographs reproduced show (1) the operation of rapid cooling in iron trays, and (2) a day's output ready for the road. We have consistently expressed in these columns the importance of replacing imports, where possible, by local original effort. Bearing metal is certainly a case in point, and we are glad to know that its local production, in careful and experienced hands, is now meeting with such a measure of support. Our visit to the work of Messrs. Knox provided us with an example of an industry built up, not by haphazard or stopgap methods, but on the solid foundation of an appreciation of mechanical necessity.

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NOTICE is hereby given that an INTERIM DIVIDEND of Twelve and One-half per cent. (12½ per cent.) for the six months ending 29th February, 1916, equal to 2/6 per share, has been declared, payable to Shareholders registered on the 29th February, 1916.

Dividend Warrants will be paid out as soon as practicable after the receipt of London Transfer Returns to that date.

The Transfer Registers of the Company will be closed from the 1st to the 6th March, 1916, both days inclusive.

By Order of the Board,
H. G. L. PANCHAUD,
Secretary.

Head Office, Johannesburg,
15th February, 1916.

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NOTICE.—The postage of this issue of the *S.A. Mining Journal* is: South Africa, 1d. All other parts, 1½d.

CONTENTS.

PAGE
Notes and News 591
Topics of the Week:
The East Rand Debate in the Assembly 593
Dr. Mellor on the Origin of Rand Gold 594
Rand Mine Accidents; Prize Scheme Results 595
Transvaal Mining in 1915 596
Mine Managers' Association Annual Meeting 598
Rand Metallurgical Practice—V. 599
Electro-Chemical Industries for South Africa 600
Progress on Central Mining-Rand Mines Producers ... 601
The Position of the City and Suburban 603
Correspondence and Discussion: "Karroo Coal Controversy"; "State Mines Prospects"; "Coalfields—View of Truck Shortage"; "National Diamonds" 604
Company Meetings: Daggafontein: Phoenix: Messina: African Life 607
The Week in the Sharemarket 612
The Week in the Mining Material and Engineering Trades 613

Notes and News.

The Premier Meeting. Not a big amalgamation, after all; but "the closest co-operation" between producers is to be the outcome of the negotiations in the diamond industry. The chairman's speech at the Premier meeting yesterday is unavoidably held over to our next issue, which will contain a full report. The speech shows very clearly the difficulties in the way of a more complete fusion of interests, and the present arrangement will, doubtless, have to suffice till times become more settled.

* * * *

Sakalava. A notice appears in our advertising columns regarding a further issue of shares on very attractive terms by the Sakalava people. The enterprise appears to be run on sound lines, and shareholders can expect a fair run for their money. The issue seems as promising and as attractive a speculation as anything in the always very speculative nature of oil-seeking in Madagascar can hope to be.

* * * *

Diamond Mines in South-West. In the House of Assembly this week, Mr. Boydell was informed by the Minister of Mines that permission was given about November, 1915, to re-start the diamond mines at Luderitzbucht, provided that all the mines concerned did not collectively produce more than 10,000 carats per month. If they were eventually disposed of by the Government the division of the proceeds would follow the law governing the Protectorate.

* * * *

New Robinson Deep Shaft Christened. The new shaft of the Robinson Deep was formally christened last Saturday morning by the Chairman of the Company, Mr. D. Christopherson. It is understood that the contractors, Messrs. W. H. Ratcliffe and Co., are making an effort to create a new record in the sinking of the shaft. The firm concerned was responsible for the circular shaft at the City Deep, in addition to which their experience of this work includes the sinking of a total of 15 miles of shafts in England. Their present undertaking is to be a seven-compartment pit, 4,500 feet deep. In the ordinary course a shaft of these dimensions would take four years to complete, but Messrs. Ratcliffe are making an endeavour to have it finished in three years from date, or at the most three and a half years.

* * * *

The African Life. A full report of the proceedings at the eleventh annual meeting of the African Life Assurance Society, appears in this issue. As will be seen from the speeches of the Chairman, Mr. Bauman, and the Managing Director, Mr. Schlesinger, the Society has had another highly successful year, and, despite the difficulties of the times, the business continues to gather strength and volume as it goes. There never was a time when the truth of Mr. Schlesinger's advice to South Africans to "economise and to keep the money in the country" was more patent than to-day, and the success of the African Life is, in itself, standing testimony to the fact that the lesson has not been preached in vain. With characteristic enterprise, the Society has added an "industrial" branch to its other activities, and already the results are highly promising. All concerned, notably, the indefatigable Managing Director, Mr. Schlesinger, are to be congratulated on the splendid position now achieved by the Society, in the face of the keenest competition.

* * * *

A Suggested East Rand Amalgamation. A correspondent of a London contemporary states that an examination of the accounts of the East Rand Deep, East Rand Extension, New Boksburg, and Rand Nucleus Companies discloses the fact that among them they possess something like £100,000 in cash, apart from other assets. Being contiguous areas, he suggests a pooling of interests and the initiation of a development scheme. We believe that the matter has not escaped the boards of the companies mentioned, who would be only too glad if the claims could contribute to the gold output. Work in the past has given so little encouragement, however, that great hesitation is shown in resuming operations. Some decision ought to be come to as to whether the assets should be distributed, for, while anything to the shareholders now would be only a sop, it would doubtless be welcome.

* * * *

West Rand Central.

Mr. J. W. H. Stubbs has made the following report on the West Rand Central Mine, dated Randfontein, 23rd November:—" At the request of your General Manager, Mr. G. Goodwin, I have inspected your property with the intention of passing my opinion as to the payable life of the mine. . . . A recovery of 6·7 dwts. per ton is necessary to cover the working costs, and from the assay plan there is only one block of 876 tons that is profitable; at the same time, I should advise the blocks of ore marked 3E, 4D, 4E, 5C and 6D, representing 19,393 tons, at a mine value of 7·45 dwts., to be re-sampled, as the grade is near the pay limit and calls for further investigation. . . . As there are no rich shutes of ore above this horizon that might be encountered by opening up the 19th and 20th levels, I cannot advise the expenditure of sinking the shaft and developing the two lower levels. If you did contemplate sinking the shaft, it would be necessary to equip sections of the shaft above the 18th level, which is in a dangerous condition, and would mean additional cost. Ore Reserves.—This represents 137,573 tons at a mine valuation of 4·2 dwts., of which 38,540 tons have to be developed, and 69,379 tons unvalued ore bodies which contain the boundary pillars, a possible grand total of 206,952 tons. It is a serious suggestion on my part to advise the closing down of a mine that has such reserves in sight. I have gone into the mining costs with your manager to see if these could be reduced and so enable your company to continue profitable operations by mining the higher grade blocks of ore only, but the small scale on which your mine is worked will not permit of any such reductions; in fact, during the war period, mine material and stores have gone up so much that an increase in working costs can be expected. Under such circumstances, I can only advise closing down the mine and withdrawing the plant as the water rises, with the view of amalgamating the property with one of your neighbours who may be working on a larger scale and at a reduced cost."

* * * *

Daggafontein.

At the meeting held on January 24 (reported fully in another part of this issue), the arrangement whereby the Daggafontein Gold Mining Company is to be financed, a new company formed, and provision made for the acquisition of additional capital, was sanctioned by the shareholders. The chairman explained fully points that had not been clear to the minds of some of the shareholders. Though a new company is to be formed, the old company is provisionally to be kept alive, and will hold the disposal of rights to receive one new for each two old shares and option rights in trust for the existing shareholders of the Daggafontein Gold Mining Company. This arrangement, quite out of the usual course, is to be attributed to a desire to keep the old form of shares in existence, so that marketability is retained and existing shareholders can deal with the shares they now own. Were the old shares to be given up and new shares received, there might be restrictions which would preclude ability to obtain or dispose of the new form of shares. By means of keeping the old form of shares alive dealings can continue to be effected. In all other respects the procedure will be the same as if the conversion of shares had been carried out. The new company can receive from the guarantors funds sufficient to go on with work, but any new shares issued to them for cash necessary for additional working capital will not be negotiable in the market until present Stock Exchange regulations are relaxed. Should the committee appointed by the Treasury to deal with new issues recognise that the object of the company to obtain gold is one that will authorise its sanction of issue of new capital, then any bar to dealings in the shares would doubtless be removed.

South African Industries.

The need for local manufacturers to make their hold of the market secure was emphasised by Mr. J. M. Buckland, at a recent meeting of the South African National Union. One way of doing this, he said, was to establish in Johannesburg a permanent sample room of South African products and manufactures, on the line of a similar institution which had been successfully maintained for some years by the Netherlands Chamber of Commerce, and which had greatly increased the sale of Dutch manufactures in this country. Active steps were greatly needed to bring home to both the wholesale and retail buyer the variety and quality of goods now being made in South Africa. Such a permanent display as he had mentioned would do more to bring home to the public the progress that had been attained than any efforts that the local agents were able to make. The S.A.N.U. was prepared to carry on such a permanent exhibition of local manufactures, and the cost to each exhibitor would not exceed £12 per annum. It was a pity that each manufacturer was still content with endeavouring to push his own wares. A concentration of effort would be much more valuable, for the individual would benefit by the greater attention that would necessarily be drawn to local industrialism in general. Such sample rooms should be established in all large centres, but a beginning might well be made in the already large and steadily increasing market of the Witwatersrand.

* * * *

Diamond Trade Improving.

It is gratifying to be able to report a further improvement in the diamond market for all classes of diamonds suitable for the American trade, says the *Financial News*. Up to a few weeks ago only the very finest colours found buyers. The demand has now spread to all other colours, and, as a result, the Diamond Syndicate were enabled to raise considerably the prices of their Wesselton shipment, which they are marketing this week. We are informed that the character of the business done was good, and that further important steps are being taken to maintain the market on a safe basis. The opinion seems at last to prevail that the big producers and settlers will nurse the trade, and by this means avoid the mistake of the past. As all the diamonds are now being sold in the States, it stands to reason that the exportations from here will benefit the exchange, and those well qualified to judge, from past experiences of over-production on the part of the big producers, would certainly welcome an authoritative statement from these quarters. Common and Industrial diamonds have not moved yet, remaining at their original prices. These are considered to be at least 100 per cent. too cheap in comparison with all other classes of goods now being sold.

* * * *

Mining and Military Engineers.

The emergencies of the present European War have been of such constant occurrence and have been met with such brilliant fortitude, especially by the Royal Engineers, that they have been given a glowing tribute by Sir John French in a dispatch dated October 15, 1915, in which he calls special attention to the splendid work carried out by those " companies officered largely by *mining engineers* and manned by professional miners." He writes: " I have on previous occasions called your Lordship's attention to the admirable work of the corps of the Royal Engineers This work covers a very wide field, demanding a high standard of technical knowledge and skill, as well as unflagging energy. The necessity for skilled labour at the front has been so continuous that Royal Engineer units have frequently been forced to forego those periods of rest which at times it has been possible to grant to other troops; but, in spite of this, they have responded loyally to every call on their services. Notwithstanding the heavy casualties sustained by all ranks, the *esprit de corps* of the Royal Engineers is such that the new material is at once animated by the same ideals, and the same devotion to duty is maintained. I desire to call your Lordship's attention to the splendid work carried out by the Tunnelling Companies These companies, officered largely by mining engineers and manned by professional miners, have devoted themselves whole-heartedly to the dangerous work of offensive and defensive mining, a task ever accompanied by great and unseen dangers. It is impossible, within the limits of a dispatch to give any just idea of the work of these units, but it will be found, when their history comes to be written, that it will present a story of danger, of heroism and of difficulties surmounted, worthy of the best traditions of the Royal Engineers, under whose general direction their work is carried out."

* * * *

Metals and Munitions.

Copper, zinc, aluminium, nickel, and other metals being of such enormous importance in the production of munitions it is not surprising to learn that the Institute of Metals (which takes within its purview all metals except iron and steel,) is very closely concerned with the production of the thousand and one metal articles required for the successful prosecution of the war. The Institute is in daily touch with many of the munition factories throughout Great Britain, and also with certain Government Departments requiring metallurgical information. As an indication of the utility of the publications of the Institute of Metals (particularly at the present time) it may be mentioned that large shipments of the Journal of the Institute of Metals, in which are recorded the very latest scientific methods of dealing with the non-ferrous metals, are being despatched to Japan and the United States for use in works engaged in producing munitions for the allies. In addition, volumes are being sent to various public and university libraries located in the United States' munition centres. German submarines have taken toll of large consignments which were sunk in the Hesperian and the Arabic, but duplicate sets of volumes have now replaced those lost in this manner. The volumes are supplied gratuitously to members—numbered among whom are most of our important munition makers—but copies can be purchased by non-members from the offices of the Institute of Metals, Caxton House, Westminster.

* * * *

Copper in Germany.

From an interesting article by Gilbert Hirsch, the Berlin correspondent, in the New York *Evening Post*, we learn there is no copper famine in Germany; there is not going to be one. England, to be sure, has decreed that no American copper shall go to Germany, and no American copper goes there. Some copper did get through by way of Holland and Scandinavia in September of last year; but England put an end to that by bringing pressure to bear on Holland and the Scandinavian countries. This interfered with the business of Scandinavia and Holland, prevented Italy from getting some of the copper which she needed to arm herself for participation in the war, cut down the output of the American copper mines and caused a boom in the German copper industry. As to the ultimate object—a shortage in the German ammunition supply—it does not exist and is not in prospect. The cutting off, to be sure, of the 35,000,000lb. of copper which Germany was accustomed to get from America every month has had an appreciable effect. In times of peace Germany, the second largest copper manufacturing country in the world, makes articles containing 225,000 tons of copper. This year it makes none of these articles, devoting its entire copper supply to military purposes. No copper money is minted and the resulting shortage in small change is already making itself visible in the requests posted in many retail stores, that customers give the exact change in payment. You hear of how carefully the copper from used ammunition is being saved; of the rounding up of all the available copper in every position captured from the enemy. You see women walking through the streets carrying between them copper kettles or gramaphone horns to sell to the authorities. If you are a householder, you are invited to fill out long detailed forms describing everything you have made out of copper or brass and specifying whether or not the artistic or historical value of each piece is double the value of the raw material contained in it; for the German Government has determined not to melt down anything that might be considered a work of art. From all these symptoms one might conclude, if not acquainted with German psychology, that Germany is face to face with a real copper famine. But all these measures, like the use of the bread-card, and the prospective milk-card, are precautions against a shortage and not the confession of one.

TOPICS OF THE WEEK.

THE EAST RAND DEBATE IN THE ASSEMBLY.

The net effect of the Labour Party and the Nationalists "butting into" the Far East Rand question has been its relegation—not actual but prospective and following on the postponed completion of the debate—to the painstaking and methodical processes of a Select Committee. Fortunately, that Select Committee will have immediately available a large volume of evidence, collected over a period by the Mines Department, through its geologists and engineers, which Mr. Malan promised to bring forward. Though, outwardly, the matter appears to have made little or no progress since debated a full year ago in the Assembly, the interval, we believe, has not been entirely wasted. Twelve months ago the outgoing President of the Chamber of Mines summed up the position, as it had evolved through discussion in our own columns and in Parliament. "A good deal of publicity has been given lately to the question of the possibilities of the far eastern section of the Rand," said Mr. Wallers at the annual meeting of the Chamber. "It is, of course, to be realised that blanks as well as prizes exist in that neighbourhood, but avoiding, on the one hand, an unnecessarily gloomy view, we can have reasonable grounds for hoping that this area, if exploited without loss of time, may satisfactorily take the place of some mines in the more central area that eventually become worked out. There can be no doubt that the Government realises the vital necessity of getting this section of the fields prospected and developed, and I take it that their first step will be to modify the Gold Law in such a manner that they will have greater elasticity in dealing with the area in question. Having obtained that elasticity in the law, they will then necessarily have in mind the fact that the demand for capital at the end of the war, to replace the destruction that has taken place, will be enormous and continuous. Very attractive terms, therefore, will require to be devised in order that the possibilities for the individual or individuals who will necessarily have to provide very large sums of money may be commensurate with the undoubted mining risk that is presented." Ostensibly the position seems much the same to-day, if a trifle complicated by the new-found anxiety of the Labour people and the Nationalists to work the Far East on what Mr. Merriman scathingly terms the "dockyard stroke." Mr. Merriman's great powers of ridicule and the good sense of the House may safely be trusted to deal with the Labour-cum-Nationalist proposals. Mr. Duncan, Mr. Merriman, and the Minister of Mines, at any rate, made short work of the only arguments in their favour adduced. How far the latest Select Committee will further delay the much-desired amendment to the Gold Law referred to by Mr. Wallers remains to be seen. It is an open secret that the amendments required to cause that measure to encourage rather than, as at present, to stultify effort on the Far East and in the outside districts, are neither so numerous nor so complex as to defy inclusion in a short and simple amending ordinance. As a fact, such a bill was drafted last year, and its passing, as indicated by Mr. Wallers, is the first and most obvious step to encourage interest in the Far East Rand. When and how soon and on what terms capital can be attracted to the district is a more difficult question, on which expert opinion is far from unanimous. It is in framing replies to these questions that we hope the Select Committee will have the benefit of the best brains in the country, and the sympathetic assistance of unbiassed leaders of financial opinion in London. It may be added that comment on the debate is rendered difficult by the failure of those responsible for the telegraphed summaries to understand the subject. Thus the following from the *Rand Daily Mail's* correspondent confuses two important questions:—

> "There was great curiosity to know the facts as to the alleged negotiations between the Government and private individuals regarding the leasing of some of the East Rand areas. Mr. Malan regretted that he could disclose nothing, nor even undertake that the House should have opportunity to ratify any bargain which might ultimately be made. Nobody, he pointed out, would go into the market to raise money on a contingency depending on a vote of Parliament. The only satisfaction he could offer to the House was that should they be dissatisfied with the disposal the country's assets they could punish the Government."

In another part of the *Mail's* report we are definitely told Mr. Malan said " the Government had refused to amend its terms as requested by the lessees " of the State Mines Areas. This seems to be the correct reading, and the concluding portion of the first quotation seems to refer to future leasing schemes, and not to hold out hope that the State Mines scheme is still under revision.

DR. MELLOR ON THE ORIGIN OF RAND GOLD.

It is not long since the problem of the origin of the gold in the banket reefs of the Witwatersrand was considered, even by geologists of standing, to be one of merely academic interest. The necessity of taking into consideration the possibility of a material falling-off in gold values in depth, and the fact that such a falling-off has actually been predicted as one of the indisputable conditions of deeper level mining by persons who are admitted to have an intimate knowledge of these conditions, are circumstances that have led to more serious views upon the subject. It is, therefore, gratifying to find that there is the probability of a thorough discussion of the whole question both here and in London as the outcome of a long and fairly comprehensive paper which has recently been contributed by Dr. Mellor, of the Geological Survey, to the *Transactions* of the Chemical, Metallurgical and Mining Society and of the Institution of Mining and Metallurgy. As we had occasion to remark, a few weeks ago, the partial and more or less casual discussion of the diminution of values in depth, or otherwise, in the bankets of the Rand, which formed part of a wider review of the subject that followed upon the reading of Mr. T. A. Rickard's paper on the " Persistence of Ore in Depth " before the latter Institution, was not by any means of an exhaustive or even adequate kind. The opportunity afforded by Dr. Mellor's contribution to say all that there is to be said about the gold in the Rand banket, as far as our present knowledge goes, is one, it may be hoped, that will not fail to be appreciated to the very fullest extent. The geological survey of the Witwatersrand has been carried on by Dr. Mellor, personally, during a period of five years or so, and, as he himself observes, there is one great advantage in the whole of a work of this kind being carried out practically by a single geologist, in that he must necessarily become familiar with the whole extent of the field, and thus be able to base his conclusions on a wider personal knowledge than would otherwise be the case. The results of the survey have been published in detail from time to time, and have been subjected to discussion and criticism, and in the paper under review the object has been to give a summary of the main conclusions rather than to repeat the evidence upon which the conclusions have been based. Those who have read the periodical reports referred to, and have made themselves acquainted with the criticism and discussion which have resulted from them, will be prepared to admit that the data provided by the survey have been of a most detailed and elaborate nature. The methods adopted by Dr. Mellor in his work, and the painstaking way in which every inch of the Witwatersrand has been investigated geologically, afford sufficient proof of the exceptional and unique value of the evidence that has been collected by him, and it goes without saying that no one can be so competent as he to draw sound conclusions from this mass of evidence and from the equally great amount of confirmatory data that has not yet been published. This is obviously a point of some importance, when it is remembered that the problems of the Rand banket have hitherto been dealt with mainly, if not entirely, in the light of information obtained from comparatively limited sources. As he points out, the examination of the Witwatersrand system in the more recently explored region of the Far Eastern gold field has revealed much that was essential to a sound knowledge of local geology; indeed, it may reasonably be claimed that the stratigraphical data of that region afford a key to the understanding of nearly all the difficulties which have hindered a solution of the various problems connected with the subject. The way in which this proposition has been developed by Dr. Mellor in his recent paper forms not the least interesting and convincing portion of it, even to those of us who are already familiar with his line of argument. Leaving aside the stratigraphical and structural details of Dr. Mellor's paper, which are, as has been explained, a summary of what has already been published, we may proceed to the conclusions that he has drawn from them. They comprise a new and forcible statement of the whole position from the standpoint of the placer theory of auriferous deposition as opposed to the more generally received and more strongly supported theory of infiltration. Having established the fact that the Main Reef Leader, the most important conglomerate bed of the Main Reef group, is of deltaic origin, Dr. Mellor goes on to show how the gold contents of the conglomerate bear every appearance of having been deposited by sedimentary processes. The many objections to this view are opposed by evidence obtained from investigations of the "beach placers" of Nome and other fields, where careful examinations of the deposits have been made by geologists of the United States Survey. The fineness of the gold particles in the banket, and their re-crystallization are shown to be quite consistent with the conditions associated with purely sedimentary occurrences elsewhere, and in this connection some observations of Daubrée on certain deposits near the thermal springs of Bourbonne-les-Bains are prominently referred to. The case for the sedimentary origin of the gold having been elaborately presented, the evidence which has been adduced in favour of the infiltrationist view is dealt with *seriatim* and at length. In this connection the well-known articles of Mr. Baring Horwood, which are the latest and probably the most comprehensive contribution to infiltration literature, are especially referred to, and it becomes abundantly clear why Dr. Mellor refrained from taking any very lengthy part in the discussion thereon which appeared in the *Mining and Scientific Press*. The question of the persistence of gold values in depth, which is, of course, the most important matter of all, depends to a very great extent upon the truth or otherwise of the sedimentary hypothesis. The real importance of Dr. Mellor's paper, therefore, lies in the soundness of his conclusions with regard to this question. Rickard's opinions upon the subject, as being the only ones of outstanding interest, naturally come in for consideration, and speaking of the ridicule which this critic throws upon the expectations of Rand engineers that profitable banket will extend to 18,000 feet on the dip, the paper continues:—" It is only fair to assume that this attitude was adopted without knowledge of the amount of information we possess with regard to such a chain of mines as the Van Ryn, Kleinfontein, Van Ryn Deep, Brakpan and Springs. Here we have the essentials of the expectations referred to more than realised." There is no doubt, of course, that Rickard has definitely stated his belief that the Rand bankets are decreasing in value in depth to an appreciable extent, and his belief appears to be part of the general proposition that ore deposits do diminish in value as they are followed downwards. In so far as this proposition again is founded upon evidence derived from lodes where the infiltration hypothesis may be accepted as an explanation of the presence of the ores concerned, Rickard's view is apparently quite inapplicable to the Rand. The reference to the great distance along the dip at which gold is being mined profitably on the Eastern Rand, however, is not in itself an answer to this view, inasmuch as Rickard has made it plain that he speaks of vertical depth. It is maintained by him that as vertical depth increases the flow of ore-bearing solutions and the depositions of the ores themselves are checked and finally hindered altogether from various causes. In this he is doubtless correct, but since the relation between vertical depth and horizontal extension is so very different in the stratified deposits of the Rand from what it is in lode occurrences generally, this argument can scarcely be considered to be as valid with regard to the banket as with gold reefs elsewhere. It has been impossible to give more than an outline of Dr. Mellor's paper, which may well be said to be an event of the highest importance in the history of geological enquiry, either here or elsewhere. Nothing so interesting or suggestive of valuable discussion has ever been read at any meeting of the Chemical, Metallurgical and Mining Society, nor, we feel justified in saying, before any gathering of the Institution of Mining and Metallurgy.

RAND MINE ACCIDENTS: PRIZE SCHEME RESULTS.

Winners of Competitions—List of Returns for the Year—Creditable Figures.

The Prize Competitions for the lowest underground death-rate, and for the greatest improvement shown in the underground death-rate for the calendar year 1915, inaugurated by the Prevention of Accidents Committee of the Rand Mutual Assurance Company, Limited, has now been decided, and the winners are as follows:—

Competition 1.—For the lowest accident death-rate among underground employees: Winner—*The West Rand Consolidated Mines, Limited*, with a "nil" return.

The Bantjes Consolidated Mines, Limited, and the *New Unified Main Reef Gold Mining Company, Limited*, also had "nil" returns, having had no deaths during the year from underground accidents; but, in terms of the rules of the competition, the West Rand Consolidated Mines, Limited, is adjudged the winner as they have a larger number of underground employees than either of the other two mines.

The prizes in this competition are a Parchment Certificate, which will be given to the winning Mine, and to each Mine Captain, Shift-Boss, and other corresponding underground officials an engraved memento suitably inscribed, of the value of about £3.

Competition 2.—The floating trophy (a Shield), for the mine showing the highest number of marks for accident improvement, goes to the *Geduld Proprietary Mines, Ltd.*

The other winners, whose names will be inscribed on the Shield, are the *New Unified Main Reef Gold Mining Company, Limited*, and the *East Rand Proprietary Mines, Ltd.*, (Cason Section).

Prizes of £10 cash bonus will be given to each Official of the winning Mine in each class showing the best improvement on its own accident record, for the previous three years.

Winners of the three classes are as follows:—

Class "A":—Mines employing less than 1,500 underground employees—*The New Unified Main Reef Gold Mining Company, Limited*.

Class "B":—Mines employing from 1,500 to 2,500—*Geduld Proprietary Mines, Limited.*

Class "C":—Mines employing 2,500 and over—*The East Rand Proprietary Mines, Limited* (Cason Section).

The Committee have decided that inasmuch as the *Bantjes Consolidated Mines, Ltd.*, and the *West Rand Consolidated Mines, Limited*, both have "nil" returns, and as the marks gained by them in Competition 2 are higher than those gained by any other mine in the other classes, that special prizes of £5 each shall be awarded to each of the officials concerned on these mines. This reward is to be regarded as being made without creating any precedent for the future.

It may be noted that Mr. Newhouse, the Chairman of the Geduld Proprietary Mines, Limited, the holder of the Shield, is also the Chairman of the Prevention of Accidents Committee.

Final figures for the Competition are attached hereto:—

	1912-14	1915.		
Class A—Under 1,500 underground employees.	Underground Accident Death Rate	Underground Accident Death Rate.	Underground Average labour White and Black.	Position in Competition II.
New Unified...	.42	nil	576	+104.2
Ginsberg	8.33	4.08	980	+ 93.5
Meyer and Charlton	3.75	1.27	787	+ 90.9
Glencairn	5.53	3.49	859	+ 57.3
Aurora West	3.13	1.86	1,076	+ 53 3
E.R.P.M., South Section ...	7.11	5.68	704	+ 34 4
New Rietfontein	3.44	2.79	358	+ 25.4
Durban Roodepoort	1.20	1.12	893	+ 7.5
May Consolidated	4.19	4.90	816	— 24.0
Rose Deep, Rose Section ...	2.85	3.90	1,283	— 47.3
New Heriot	2.36	3.64	1,098	— 67.0
Vogelstruis Estate	4.19	7.21	1,248	—102.3
New Primrose	1.67	3.95	1,013	—159.3
Class B—From 1,500 to 2.500 underground employees.				
*Modder Deep	7.77	.63	1,593	—
Geduld Proprietary	4.73	.55	1,815	+130.2
Bantjes Consolidated...	2.84	nil	1,929	+128.4
West Rand Consolidated ...	2.39	nil	2,426	+125.9
Main Reef West	6.11	3.09	1,943	+ 79.6
Geld. Deep, East Section...	4.15	1.83	2,180	+ 79.1
New Goch	4.19	1.96	1,530	+ 75.5
Witwatersrand	7.06	4.31	2,088	+ 66.5
Princess Estate...	4.46	2.57	2,331	+ 61.3
Geld. Deep, West Section...	5.40	3.40	1,764	+ 57.0
*Van Ryn Deep	5.99	4.11	2,188	—
Modder B.	3.22	2.89	2,420	+ 13.6
Knight Central...	3.26	2.98	2,014	+ 11.4
Van Ryn Estate	1.78	1.95	2,048	— 11.3
Wolhuter...	1.22	1.68	2,383	— 42.3
E.R.P.M., Angelo Section...	7.11	9.54	2,412	— 58.5
Consolidated Main Reef ...	2.38	3.58	1,957	— 62.4
City and Suburban	3.26	7.55	1,988	—174.5
Luipaardsvlei	2.39	6.39	1.564	—207.4
Village Main Reef	3.67	10.39	2.118	—250.3
Class C—Over 2,500 underground employees.				
*Government G.M. Areas ...	16.02	7.47	2,543	—
E.R.P.M., Cason Section ...	7.11	2.98	2,683	+ 99.4
Simmer & Jack Proprietary	6.99	3.35	3,285	+ 88.5
New Modderfontein...	3.84	1.46	2,746	+ 85.8
Witwatersrand Deep...	5.87	2.86	2,802	+ 81.4
City Deep	9.30	6.04	4,140	+ 67.7
Roodepoort United	7.74	4.90	2,654	+ 65.1
E.R.P.M., Driefontein Sec.	7.11	5.19	2,888	+ 46.2
E.R.P.M., Comet Section ...	7.11	5.34	2,619	+ 42.6
Consolidated Langlaagte ...	3.47	2.40	2,922	+ 41.5
Durban Roodepoort Deep...	4.24	3.12	2,567	+ 37.6
Crown Mines, East Section	3.54	3.06	8,506	+ 18.4
Village Deep	4.71	4.13	3,148	+ 18.1
Crown Mines. West Section	6.53	5.87	4,773	+ 16.7
Nourse Mines	4.35	3.87	4,392	+ 15.8
Robinson G.M. Co.	5.45	5.51	2,723	— 1.7
Rose Deep, Glen Section...	2.85	4.24	2,596	— 62.7
Brakpan	4.08	6.64	3,463	— 88.3
Ferreira Deep	3.37	6.64	3.315	—129.7

*Competition No. 1 only.

Note.—In the cases of the East Rand Proprietary Mines and the Rose Deep it is impossible to give the sectional figures for the three years to December, 1914, and the comparisons have been made with average rates for the entire mine, viz., 7.11 and 2.85 respectively.

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TRANSVAAL MINING IN 1915.

Authoritative Review by a Leading Engineer—Social and Technical Questions—Notable Features of the Year.

[By H. F. Marriott.]*

The gold-mining activities of the Transvaal maintained a steady course throughout the year. The strength and solidarity displayed by this great industry have never made so great an impression as recently in the face of both war and rebellion. The need of keeping the production of gold at the highest possible level was recognised by all, and to this end the captains of the industry, assisted by a good supply of labour, devoted themselves. Tables 1, 2 and 3 show respectively the increased yield, the enlarged milling capacity and the improved labour position attained during the year. On September 30 there were 53 producing companies on the Rand. Working costs were 6d. a ton higher, chiefly because of the increased price of materials and stores.

Table 1.—Transvaal Gold Production.

Witwatersrand District.

Year.	Tons milled.	Value.	Value per Ton milled. Shillings.	Outside Mines. Value	Total value for Transvaal.
1884-89	1,000,000	£2,440,000	48.8	£238,231	£2,678,231
1890	730,000	1,735,491	47.4	134,154	1,869,645
1891	1,154,144	2,556,328	44.2	367,977	2,924,305
1892	1,979,354	4,297,610	43.3	243,461	4,541,071
1893	2,203,704	5,187,206	47.0	293,292	5,480,498
1894	2,830,885	6,963,100	49.2	704,052	7,667,152
1895	3,456,575	7,840,770	45.2	728,776	8,569,555
1896	4,011,697	7,864,341	39.2	739,480	8,603,821
1897	5,325,355	10,583,616	39.7	1,070,109	11,653,725
1898	7,331,446	15,141,376	41.3	1,099,254	16,240,630
1899	6,872,750	15,067,473	48.8	661,220	15,728,693
1900	459,018	1,510,131	65.8	—	1,510,131
1901	412,006	1,014,687	49.2	81,364	1,096,151
1902	3,416,813	7,179,074	42.0	74,591	7,253,665
1903	6,105,016	12,146,307	39.8	442,941	12,589,248
1904	8,058,295	15,539,219	38.5	515,590	16,054,809
1905	11,160,422	19,991,658	35.8	810,416	20,802,074
1906	13,571,554	23,615,400	34.8	964,587	24,579,987
1907	15,523,229	26,421,837	34.0	981,901	27,403,738
1908	18,196,589	28,810,393	31.6	1,147,217	29,957,610
1909	20,543,759	29,900,359	29.1	1,025,429	30,925,788
1910	21,432,541	30,703,912	28.5	1,297,823	32,001,735
1911	23,888,258	33,543,479	28.1	1,498,006	35,041,485
1912	25,486,361	37,182,796	29.2	1,574,765	38,757,560
1913	25,628,432	35,812,605	27.8	1,545,435	37,358,040
1914	25,701,954	34,124,434	26.5	1,463,641	35,588,075
1915 (est.)	27,949,466	36,782,131	26.3	1,346,444	38,138,575

Operations were hindered in several cases by abnormal natural occurrences. Early in the year excessive rainfall caused the flooding of several workings and brought about delays more or less serious. One instance was at the Bantjes Consolidated Mines where, in December, 1914, the central incline shaft collapsed through the saturation of the decomposed dyke above the sandstone forming the roof of the shaft. This matter is referred to again herein. Another disturbing agent was the recurrence of earth tremors along the reef. This affected portions of the workings of the Ferreira Deep and Village Main Reef mines, in which heavy falls of rock took place, temporarily interfering with hoisting. Owing to the continuance of this phenomenon, an Earth Tremors Commission was appointed, which consisted of the Government Mining Engineer, the Government Astronomer, and a consulting engineer from one of the mining groups. The Commission held its first meeting on June 29th, but has not yet published its findings. Two mines in the Far Western Rand went into liquidation—the French Rand Gold Mining Co., Ltd., and the Lancaster West Gold Mining Co., Ltd. The New Rietfontein, on the Du Preez reef, north of the Main Reef Series, had to be closed owing to lack of further prospective profit. On the other hand, arrangements were made to re-open the eastern portion of the Jupiter mine, and milling, which had been discontinued in 1913, was resumed on September 1st. The New Goch and Randfontein Central re-appeared in the list of dividend payers.

Another Important Amalgamation.

After negotiations extending over several years, a scheme was finally agreed to in December for the amalgamation of the Robinson Deep Gold Mining Co., Ltd., Booysens Estate, Ltd., and South Deeps, Ltd. It was decided to form a new company, to be called Robinson Deep, Ltd., with a capital of 500,000 cumulative preference shares of 1s. each (" A " shares) and 900,000 shares of £1 each (" B " shares). The result of the amalgamation to the producing company, it was estimated, would be to give its shareholders in the new company a guaranteed income from dividends during 25½ years, as against dividends during a few years only if the old company retained its corporate existence.

Table 2.—Stamps and Tube Mills.

	Stamps at Work.	Tube Mills at Work.	Duty per Stp. p. Day.
1909, December	9,250	148	6.8
1910, December	9,150	184	7.2
1911, December	9,565	244	7.9
1912, December	9,440	277	8.4
1913, December	9,170	278	8.7
1914, December	9,291	294	9.1
1915, September	9,515	315	9.6

Considerable attention was again devoted to the Eastern Rand. Nine companies were producing in 1915, eight of which paid dividends. The ore crushed was at the rate of 4,730,000 tons a year. Preparations are being made to raise this output during 1916 to 6,750,000 tons a year. Development generally was good, and confidence in the district has been still further strengthened. The Springs Mines, Ltd., drew nearer to the producing stage and commenced the erection of a plant with a capacity of 360,000 tons a year. Development at this mine to the end of September disclosed ore of which 54 per cent. was regarded as profitable. Several extensions of plant were considered. Orders were placed by the New Modderfontein Gold Mining Co. for an additional reduction plant of 40,000 tons per month, which, with the existing plant, will enable the company to treat about 1,100,000 tons a year. The Government Gold Mining Areas (Modderfontein) decided to double its plant by the addition of another 100 stamps. The Geduld Proprietary Mines decided also to extend its plant so as to increase its capacity from 24,000 to 40,000 tons a month. This company paid its first dividend in February, the rate being 5 per cent. The mill of the Modderfontein Deep Levels made its first full month's run in January, when it crushed 25,570 tons of an average gold content of 37·8s. Towards the end of the year more than 34,000 tons of ore a month were being treated at a working profit of about 20s. a ton. An increase of plant by the addition of 10 stamps was decided upon, the cost to be met out of profits. A dividend of 10 per cent. was paid in respect of the half-year to June 30, this being the company's first distribution. Very good developments were recorded at the Van Ryn Deep. At this mine the gold left in the slimes residue was reduced to less than 8d. a ton.

Gold Mining and the War Expenses.

The arrangements made at the beginning of the war for realizing the gold produced and obtaining supplies continued in force during the year under review. To assist in meeting the expenses of the war and the rebellion, the Union Government imposed extra taxation on " the profits of mining for gold," in the form of a special levy of £500,000, to be paid during the financial year to end March 31, 1916. This sum is approximately 5 per cent. of the profits earned, as calculated for the purpose of profits tax, and a first instalment of 2½ per cent. was due on December 31, 1915. The Vaal River water supply scheme sanctioned by the Union Government during the previous year could not be carried out on account of the difficulties in the way of raising the necessary loan. There is, however, no immediate cause for anxiety in regard to water supply. A revival of interest in mining in the Murchison Range district was brought about by the opening of the Zoekmakaar-Komati Poort railway, which linked together the Delagoa Bay line and the Messina-Pietersburg extension. Lack of enterprise in the district had been previously caused not only by the difficulties of transport, but also by the refractory nature of the gold ores due to the presence of antimony. With regard to the latter, a process for dealing cheaply and successfully with the ores was brought forward, and a treatment plant was installed at the United Jack mine and started in October. Revenue from both the gold and antimony contents of the ore was expected.

Table 3.—Labour Employed in Transvaal Gold Mines.

	Whites.	Natives.	Native Death Rate per 1,000.
1910	25,376	191,784	35.72
1911	25,108	194,286	31.01
1912	24,334	206,121	28.83
1913	22,797	162,181	26.61
1914	21,834	177,291	20.61
January. 1915	21,765	181,194	
March	22,179	197,543	
May...	22,415	200,162	12 m'nths ending
July...	22,765	201,465	Sept., 1915,
September	23,516	215,332	19.76

The most important item with regard to labour was the abolition of the flat-contract system by companies affiliated to the Transvaal Chamber of Mines. This took place as from June 1, existing contracts remaining in force until their expiration. Under this system a miner was paid a fixed sum per square fathom broken, irrespective of subsequent variation in the nature of ground during the period of his contract, and out of this sum he had to provide explosives and native labour. His remuneration, therefore, was liable to great variation as his work progressed, and to the system was attributed the migratory character of underground labour. No particular method of payment was substituted in place of this system, it being left to those concerned to arrange matters so that, in accordance with the wishes of the Government, all mine employees should obtain a certain definite daily wage. The abolition of the flat-contract system was among the recommendations made by the Economic Commission and the Dominions Royal Commission. A joint committee of the Transvaal Chamber of Mines and of mine employees was formed to consider the cost of living and a demand of mine workers for an increase of wages. A memorandum of agreement was adopted on July 23 and accepted by the mining groups and the workers' unions. The terms of the agreement related chiefly to wages, hours and overtime.

Social and Technical Improvements.

The aim of " safety first " was kept before mine workers by the monthly circulation, gratis, of a magazine called *The Reef*, published under the auspices of the " Safety First " Committee of the Rand Mutual Assurance Co. The first number appeared in July. Among the contributors were the Minister of Mines and the Government Mining Engineer. With a view to increasing the knowledge and efficiency of underground employees the Transvaal Chamber of Mines distributed a pamphlet by E. M. Weston entitled " Practical Mining on the Rand." Intended for the use of shift bosses and miners, it gave hints and directions in regard to the types of rock drills in use on the Rand and the handling of them underground, the nature and use of explosives, development, stoping and hammer work. The progress in technical matters was reflected in a number of excellent papers read before various societies. Much valuable and interesting information was contained in a paper by J. H. Rider, " The Power Supply of the Central Mining-Rand Mines Group," read before the Institution of Electrical Engineers (Vol. 53, Nos. 247, 248 and 250, 1915). From this it appears that the annual consumption of the group is at the rate of about 310,000,000 electrical units and 103,000,000 air units. The most important service for which electricity is used is that of winding. Useful particulars were given of the method of metering the supplies. The latest methods in metallurgy were described by F. L. Bosqui in his paper, " Metallurgical Practice in the Witwatersrand District, South Africa," published in the *Bulletin* of the American Institute of Mining Engineers, May, 1915. Developments in the Eastern Rand received their share of attention. The geology of the district was dealt with by E. T. Mellor in a paper on " The Upper Witwatersrand System," read before the Geological Society of South Africa. Mining methods in the district were described by H. Stuart Martin and W. L. Honnold. The paper of the former was published in the *Journal* of the South African Institution of Engineers, March, 1915. In it the author described the general layout of the Modderfontein B. Gold Mines and made particular reference to the methods adopted for the transport of ore underground. The layout of this mine was designed with a view to introducing several features associated with longwall coal mining. W. L. Honnold's paper, " Mining Conditions on the Witwatersrand," appeared in the *Bulletin* of the American Institute of Mining Engineers, August, 1915. It was devoted chiefly to a description of the underground operations at the Brakpan and Springs mines. " The Centrifugal Pumping Plant of the Durban Roodepoort Deep, Limited," was the title of a paper contributed by E. G. Izod and A. P. Rouillard to the January issue of the *Journal* of the South African Institution of Engineers. The authors expressed satisfaction, after a year's trial, with centrifugal pumps, and stated the reasons that had led to the installation of this type of pump instead of the reciprocating type. The method of recovering the Bantjes incline shaft was described by Percy Cazalet and W. W. Lawrie, in a paper read before the South African Institution of Engineers and published in the Institution's *Journal* for September. The operation, it was said, was probably unique in the experience of the Rand. Standard methods of "spiling" were departed from and a system followed that was an application and modification of the " advancing-shield " method of tunneling in soft and running ground.

Diamonds and Base Metals.

The diamond mines remained closed, but it was decided to resume work on a limited scale on January 1, 1916. There was no expansion in the output of base metals. During the eight months to the end of August 2,280 tons of tin were produced and 9,529 tons of copper, as against 2,715 tons and 9,593 tons respectively for the corresponding period of 1914. The latest tin producer was the Mutue Fides property (in the Waterberg District) of the Transvaal Consolidated Land and Exploration Co., Ltd. The initial output, for May, was 10 tons, but the output was afterwards increased to 15 tons a month. The plant is expected eventually to produce 30 to 40 tons a month. The Marico Zinc Mines, controlled by the same company, had to close down owing to the difficulty of obtaining a reasonable price for the concentrates in spite of the high price of spelter.

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* Consulting Engineer of the Central Mining and Investment Corporation, 1, London Wall Buildings, London, E.C.

Heidelberg Prospects.

Those of us who have been looking for the development of the mineral wealth of this neighbourhood for many years may have ceased to be optimistic owing to many disappointments, but the belief that the development will come sooner or later is still there, says the Heidelberg paper. A gentleman just recently from London tells us that immense sums of money are accumulating there for investment as soon as the war is over and that it is probable that some ot it will come to South Africa and why not some to Heidelberg? America is making fabulous fortunes out of the war and will want many fields of investment for her millions, and we hear that already one American Company with plenty of money behind it is interesting itself in our district. The farm Spaarwater, we are told, has been taken up for prospecting with an option of purchase on terms very favourable to the present owners. Mount Arabel is receiving very particular attention with a view to the working of its gold reefs. Quite a list of properties " along the line " between the Nigel extension and the Vaal River are being held by Johannesburg houses. Two syndicates are busy prospecting in our district, not without result, and there is little doubt that the sequel will appear after the war. The finding of a good shoot in the Nigel Mine, said to be a warrant for another five years of work, is reassuring to the Nigel community.

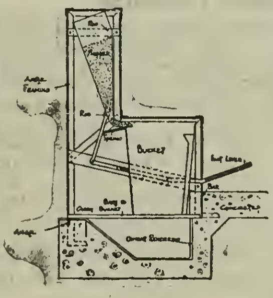
MINE MANAGERS' ASSOCIATION ANNUAL MEETING.

Presidential Review of Working Conditions on the Mines.

The twenty-first annual meeting of members of the Association of Mine Managers of the Transvaal was held on February 18th at the Chamber of Mines under the chairmanship of Mr. J. E. Healey, who, in the absence of Mr. Pam, the President, read that gentleman's annual address. Mr. Pam left early in January for active service in Europe. It was stated in the address that the President was of opinion that in past years the Association had been at fault in its advice to the controllers of the industry in dealing with white and black labour. The fault was in failing to recognise the advisability of granting direct recompense for any inconvenience or disability suffered by employees, many of whom were but poorly educated. There was no doubt that wages had been sufficiently high, but these wages were paid on an average principle, and employees were expected to distribute their expenditure in such a way as to make the best use of these wages. They naturally failed to do this, and, not appreciating the principle of a covering wage, considered themselves hardly treated. As illustrating this point he would give three instances:—(1) In spite of high wages many employees did not save money enough to take holidays, even when a period of leave was granted by the companies. (2) Employees felt aggrieved at not being paid extra rates for overtime as a right, although they were in practice usually receiving extra pay. (3) As the most important of all causes of unrest and dissatisfaction, underground employees felt that the industry had failed to do its utmost in the prevention of miners' phthisis, and that compensation was now being paid only under pressure from the Government. However, there was to-day a vast improvement in the conditions of employment, in which the Association had played a worthy part. During 1915 the following progress had been made: (1) The flat contract had been abolished. (2) An agreement had been reached by which mechanics' overtime was paid at extra rates. (3) A holiday scheme had been inaugurated which was more generous than that granted by employees in any other industry in the world. (4) Not only had their efforts for the prevention of miners' phthisis been continued unceasingly, but they were in addition making a special effort to find employment for beneficiaries under the Phthisis Act and to assist the Government to start industries for this purpose. There was, of course, always room for further progress, and the President indicated the following innovations which would shortly receive the consideration of the industry: The question of a new agreement was at present under discussion between the Chamber of Mines and the Engine Drivers' Associations. In the case of natives employed on hammer work there were at present under consideration schemes for the more equitable treatment of the matter of pay in some difficult circumstances. Referring to miners' phthisis, the President said he was of opinion that the average amount of dust breathed by the average man underground, white or black, in a shift, was less than one-tenth of the amount which he would have breathed in a similar period of time, say, five years ago. That there were cases of dust being raised or men not getting out of the mine sufficiently soon after blasting was probably true, but he stated emphatically that these were the exception and not the rule, and that if they were enabled by the Government to prevent the further incidence of tuberculosis underground, miners' phthisis on the Witwatersrand would very shortly be a thing of the past. Mr. Cazalet seconded the adoption of the annual report, which had been moved by the reader of Mr. Pam's address. The following were elected the officials for the coming year: President, Mr. A. J. Brett; vice-president, Mr. H. G. Nitch; members of Council, Messrs. J. E. Healey, J. R. Thom, E. H. Bulman, A. E. Payne, A. J. Walton, C. B. Saner, C. B. Brodigan, J. J. Wessels, P. Carter, O. P. Powell and C. Glyn.

Improved Sanitation Underground on the Rand.

THE O'BRIEN IMPROVED PATENT DRY EARTH CLOSET SYSTEM.



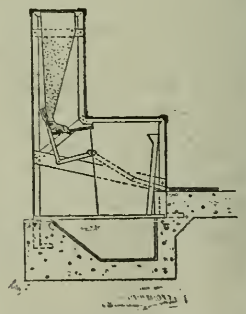
SECTION showing Hopper and Gearing in position of rest, or immediately after foot lever has been released.

The O'BRIEN Premier Dry Earth Closet System has undoubtedly proved itself to be the PREMIER of all dry earth systems, and only requires to be known on the mines to secure its general adoption.

THE PRINCIPLE OF THE SYSTEM IS THE SEPARATING OF THE LIQUID FROM THE SOLID OR FŒCAL MATTER, which is done by mechanism inside the pan. The Liquid is run into a chamber under or near the pan, which chamber is partly filled with a chemical absorbent preparation, and combining with the preparation thereby forms A PERFECTLY PURE, ODOURLESS SOLID, or by other means treated and allowed to flow away pure. The fœcal matter in the pan is automatically covered with a chemically prepared ash, rendering it absolutely odourless, and can be hoisted to the surface and carted away in open carts during the daytime.

The system itself is far superior to any other dry earth system, and has been largely ADOPTED BY THE SOUTH AFRICAN RAILWAYS and by the NEW SOUTH WALES GOVERNMENT FOR ALL BUILDINGS where no sewerage scheme is in use, also by MANY LEADING PUBLIC GENTLEMEN OF SOUTH AFRICA. In simplicity, cleanliness, and convenience it is far ahead of present practice.

Mr. DITCHFIELD will be happy to enter into Special Arrangements with Mines, Municipal and other Public Bodies, and, on application, will furnish estimates, and, if required, designs for the installation and maintenance of the system.



SECTION showing Hopper and Gearing in position while in use.

Original Testimonials received by us can be seen on application by anyone interested, at the offices.

Box 5408, Telephone No. 5649, JOHANNESBURG.

RAND METALLURGICAL PRACTICE.—V.

Discussion of Mr. F. L. Bosqui's Paper—Views of Rand Metallurgists.

THE following is the continuation of Dr. Caldecott's contribution on Mr. Bosqui's paper:—

Dissolution of the gold is thereby facilitated, and treatment time decreased, necessitating less plant and consequently economising capital. In this connection it may be mentioned that for a given daily capacity the cost of a reduction plant is now only about one-third of that before the war.

Slime Treatment.—I have already referred to the decantation method and would only add now that the chief trouble met with is unsatisfactory settlement, particularly in cold weather, and on one or two plants this has been overcome by Mr. Salkinson's method of warming the pulp by the utilisation of waste steam from the hoisting or mill engine, this incidentally increasing the capacity by as much as 20 per cent. Unfortunately, the general use of purchased electric power makes this impossible on new plants. With regard to air agitation it should be pointed out that the use of the usual tall, narrow Brown tanks is not universal. Alternatives are the employment of tanks about 30 by 30 feet, in which the central air lift does not extend to the top, and which it is claimed use therefore less power; and in some very large vats there are several comparatively narrow air-lift tubes, with tangential discharge, so as to set up a swirling motion of the whole pulp in the vat, and prevent too rapid settlement. In connection withe the Usher process it was understood that the vat acted as a huge classifier, so that the charge was not homogeneous and correct sampling became almost impossible.

Smelting.—From either method the slags still carry several ounces of gold per ton, even after crushing and panning, and even on plants where "pot" smelting is employed a pan furnace is often installed for smelting these slags with lead, in order to recover this gold; at the same time any other gold-bearing byproduct about the plant may be similarly dealt with for the extraction of its gold. Even after this, the slags obtained may receive a further treatment by smelting in a blast furnace, two or three plants having their own, but more usually selling it to a byproduct works. There were formerly several of such works, operated by independent people, but a co-operative byproduct treatment works has also been established by the gold mining companies, to which those companies which do not possess their own facilities dispose of the byproducts, which are there treated as at the larger mines. In conclusion, while there is uniformity in the main outlines of practice, it will be evident that many variations in detail exist among the 50 producing mines. This is not due entirely to the idiosyncrasies of controlling officials, for the ore itself, and other circumstances, vary somewhat from mine to mine, apart from variations in value. In some places it is harder than in others; again, the nature of the country rock exercises an influence, sericitic schist, for example, adversely affecting amalgamation, and in some cases a small proportion of other metallic minerals occurs in the ore, and doubtless has some influence; I have, for instance, found traces of telluride in some cases. It will be seen that no concentration, either "clean" by tables for subsequent chlorination, or simply rough for separating part of the pulp for longer cyanide treatment, is now employed, and, in consequence, chlorination has been completely discontinued.

There is, however, a small proportion of very clean and rich pyrite collected chiefly with amalgam, after separation from amalgam and grinding finely in small tube mills, etc., which is treated simply by agitating by air in a special small cyanide agitating plant—as first suggested by A. F. Crosse—and a large percentage of the gold is thus extracted and dealt with as usual, the residue commonly going to the main cyanide plant. This pyrite contains appreciable amounts of osmiridium, which may possibly be turned to account in the future.

W. R. DOWLING, Germiston, South Africa (communication to the Secretary).—Under "Classification," the author is somewhat in error in describing the earlier classification methods. The inverted pyramidal spitzkasten were used merely to remove some of the water in the tailing pulp, although incidentally some slime was also carried over, and the overflow being reduced in volume was more easily handled in the sand collector vats where the main separation of sand from slime took place. The author refers to the use of the vacuum sand filter table as being a method for obtaining clean sand. Obviously, this cannot be the case, as the filter table merely dewaters the clean sand previously obtained by cone classification. The sand being thus freed from water is then ready for cyanide treatment, without fear of complications arising through the introduction of cyanide solution into the mill water. The author when discussing the separation of sand from slime somewhat confuses the question by introducing the classification of pulp for tube milling into the same paragraph. When analysed, the statement in question appears to mean that the separation of sand from slime was to be effected in large cones in the same way as with those already in use with sand filter tables, except for the use of water at the apex of the cones in the former case.

(To be continued.)

Witwatersrand Deep, Ltd.

Fifteenth Drawing of Second Issue.

NOTICE IS HEREBY GIVEN that the following 5½ per cent. Debentures of the Second Issue were drawn this day at the Offices of the Company, situate at Salisbury House, E.C., for payment at par on and after the 1st day of July, 1916, from which day interest thereon will cease.

DEBENTURES OF £10.

B30 B38 B51 B74 B75 B83 B103 B112 B125 B132
B159 B195 B201 B206 B208 B215 B219 B229 B249 B251
B253 B260 B265 B271 B309 B321 B336 B341 B345 B355
B399 B404 B408 B412 B450 B452 B458 B459 B485 B497
B522 B541 B578 B579 B593 B599 B616 B635 B643 B674
B677 B698 B701 B703 B717 B721 B748 B751 B762 B769
B734 B790 B792 B797 B798 B828 B829 B838 B842 B875
B876 B912 B921 B929 B931 B949 B961 B977 B988 B1027
B1046 B1049 B1055 B1080 B1091 B1098 B1100 B1113 B1114 B1117
B1131 B1148 B1166 B1172 B1217 B1224 B1242 B1256 B1290 B1310
B1319 B1322 B1323 B1326 B1346 B1352 B1364 B1367 B1374 B1413
B1416 B1443 B1474 B1530 B1562 B1563 B1564 B1599 B1604 B1667
B1630.

DEBENTURES OF £50.

B1709 B1719 B1721 B1740 B1745 B1750 B1751 B1771 B1793 B1818
B1355 B1856 B1865 B1886 B1925 B1932 B1835 B1954 B1958 B1961
B1962 B1973 B2010 B2012 B2013 B2027 B2038

DEBENTURES OF £100.

B2070 B2071 B2089 B2095 B2109 B2113 B2120 B2130 B2185 B2199
B2202 B2205 B2212 B2214 B2226 B2270 B2303 B2313 B2339 B2368
B2396 B2419 B2440 B2481 B2483 B2491 B2513 B2514 B2559 B2576
B2579 B2580 B2582 B2586 B2590 B2637 B2639 B2652 B2655 B2659
B2659

RECAPITULATION.

121 Debentures of £10 each	£1,210
27 Debentures of £50 each...	£1,350
41 Debentures of £100 each...	£4,100
189 Debentures, amounting together to the sum of	£6,660

All the above drawn Debentures must be left at the National Bank of South Africa, Circus Place, London Wall, E.C., four clear days for examination. They may be presented at the said Bank any day (Saturdays excepted), between the hours of 11 and 2, after Wednesday, the 21st day of June, 1916.

Listing Forms may be had on application.

London, 17th January, 1916.

(By Order) DOWNES, MUNNS & CO., London Secretaries.

Present at Drawing: ALEX. RIDGWAY (of the Firm of JOHN VENN & SONS), Notary Public, 75 to 77, Cornhill, London, E.C.

ELECTRO-CHEMICAL INDUSTRIES FOR SOUTH AFRICA.—II.

Important Report by Development of Resources Committee of the S.A.I.E.E.

Appendix No. 1.

CALCIUM CARBIDE.

Calcium Carbide is produced by the direct combination of lime with carbon in the form of ground coal or coke at the very high temperature of the electric furnace.

World's Production during 1913 was 340,000 tons.

Present Sources.—Calcium Carbide is manufactured in many works of which the most important are situated in the United States, Canada and Sweden. The factors determining economical manufacture are abundant supplies at low cost of lime, coal, labour and electric power. The largest factory is at Odda in Sweden, where, during 1912, 85,000 tons of Calcium Carbide were produced by a hydro-electric plant of 50,000 h.p. from 150,000 tons of limestone, 50,000 tons of Welsh coal and 15,000 tons of lower grade coal for burning the limestone.

Power Required.—The amount of power and quantity of material required depends upon the size of furnace thus:—

For an output of 1,800 tons per annum 1 h.p. year gives 2,500 lbs. carbide.
For an output of 2,750 tons per annum 1 h.p. year gives 2,800 lbs. carbide.
For an output of 3,600 tons per annum 1 h.p. year gives 3,100 lbs. carbide.
For an output of 6,000 tons per annum 1 h.p. year gives 3,400 lbs. carbide.

Moderate-sized plants require 2,100lbs. lime and 1,400lbs. of anthracite per 2,000lbs. carbide.

Limestone occurs in very large quantities in many districts throughout the Union, but since Phosphorus and Magnesia are unfavourable to the required chemical reactions, careful analyses are necessary to predetermine the suitability of any particular deposit. Consideration must also be given to determine whether the limestone should be burnt at the quarry, at the carbide factory or at some convenient position where fuel is cheap. Theoretically 1,000 tons of limestone, when burnt, gives only 560 tons of dry lime, and in practice considerably less, so that the saving on freight by burning may be a large item.

Coal.—The coal of South Africa is, in general, high in ash and low in percentage of fixed carbon, good qualities giving 15 per cent. ash and 60 per cent. carbon; compared with Welsh coal having but 2 per cent. ash with 90 per cent. carbon. There is, however, in Natal anthracite with only 6 per cent. ash and about 75 per cent. carbon which might profitably be used if the price is not too high. The electrical energy required with high ash coal will be about proportional to the weight of material melted, so that it might pay to grind and wash the cheap coal to increase the percentage of carbon.

Cost of Plant.—Prices for electrical furnaces with an estimate for the cost of operating have been obtained from a British firm of considerable experience which is now supplying a carbide plant for the Tasmanian Government. By suitably increasing this firm's figures to meet South African conditions and assuming an output of 2,600 tons per annum, the cost of a complete plant including buildings, furnaces, limekilns, crushing plant for lime, coal and carbide amounts to £20,000, of which £4,500 is the cost of the three furnaces with transformers, switchboard and connections. Adding a further £7,500 for working capital, the total required is £27,500.

ESTIMATED MANUFACTURING COST FOR VARIOUS OUTPUTS OF CARBIDE.

(Assuming a favourable site with good lime and coal available.)

Output per annum (tons)	2,600	5,000	10,000
H.P. for furnaces	2,050	3,200	6,000
Capital cost of plant, including furnaces, lime-kilns, crushers, buildings erected complete...	£20,000	£32,500	£60,000
Working Capital required...	7,500	12,500	20,000
Total Capital necessary	£27,500	£45,000	£80,000

	Total Cost. £	Cost p. ton Carbide. s.	Total Cost. £	Cost p. ton Carbide. s.	Total Cost. £	Cost p. ton Carbide. s.
Limestone at 5s. per ton...	1,430	11.0	2,500	10.0	4,500	9.0
Coal at 15s. per ton	1,625	12.5	3,000	12.0	5,750	11.5
Coal at 10s. for lime burning	400	3.1	750	3.0	1,500	3.0
Electric power at .35d. unit or with 83 per cent. load factor = £8 10s. 0d. h.p. year	17,425	134.0	27,200	108.8	51,000	102.0
Electrodes at £20 per ton	1,430	11.0	2,600	10.4	5,000	10.0
Power for Crushers, Light, etc....	365	2.8	650	2.6	1,250	2.5
Labour	3,250	25.0	5,000	20.0	8,000	16.0
Repairs and Maintenance...	910	7.0	1,500	6.0	2,500	5.0
Office: Expense & General	1,040	8.0	1,500	6.0	2,000	4.0
Depreciation of all plant at 10 per cent.	2,000	15.4	3,250	13.0	6,000	12.0
Total	29,875	229.8	47,950	191.8	87,500	175.0
Contingencies, 20 p.c. ...	5,975	46.0	9,590	38.4	17,500	35.0
Factory Cost	35,850	—	57,540	—	105,000	—
Per ton	£13 16 0		£11 10 0		£10 10 0	

(To be continued.)

The Serbs in retreating from north-eastern Serbia are reported to have destroyed the surface plant of the copper mines near Bor, in the Department of Timok, and to have permitted the workings to be flooded to prevent the Teuton forces from availing themselves immediately of this source of copper. The principal mine is the Tehoka Dhulkan and belongs to a group controlled by the Cie. Francaise des Mines de Bor. There are numerous small deposits of copper in the Balkan States, but this company was the principal producer. Its output in 1912, according to the "Copper Handbook," was 16,699,845 lb. The smelting plant comprised four small water-jacketed furnaces, two of 110 tons' daily capacity and two 210-ton furnaces, and a converter department with one stand and four shells. In the latter part of 1912 most of the employees were ordered into the Serbian army for the Balkan war, and for a long time only one furnace was operated. Near Maidanpek, in the same general district, a 200-ton smelting plant was built in 1907 by a Belgian company, which used the Knudsen process and made a 96 per cent. copper product. This plant has presumably met with the same fate as the Bor property.

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Transvaal Offices: SACKE'S BUILDINGS, Johannesburg.
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THE STEEL CO. OF CANADA: Wire and cut nails, black and galvanized wire, tubing, steel bars and plates, bolts and nuts, rail accessories, and all steel products.
THE LANSING CO.: Barrows, trucks, concrete mixing machines.
THE AMES SHOVEL & TOOL CO.
THE SEQUATCHIE HANDLE CO.
RAMSAY, SON & CO.: Paints, enamels, etc.
THE BARRETT MANFG. CO.: Roofing felt, floor coverings, disinfectants and Tarira.
And other Canadian and American Companies. *INDENTS ONLY.*

NOTICE: To Mine Managers & Others

M. CHADWICK & CO., Scrap Metal and Rubber Buyers, are prepared to pay highest prices for Copper, Brass, Lead, Zinc, Cast Iron, or metal of any description. Lead, Zinc, White Metal in Ingots always on hand for sale at lowest prices. Write, send, or Telephone 5072, Box 2700, 55, Sauer Street. Prompt attention guaranteed. Distance no object.

PROGRESS ON CENTRAL MINING-RAND MINES PRODUCERS.

Points from Quarterly Reports.

Crown Mines.

The reef disclosures at the Crown Mines during the quarter ended December 31 were as follows:—Main Reef Leader: Distance sampled, 3,510 feet; width, 22 inches; assay value, 14·7 dwts. South Reef: Distance sampled, 4,080 feet; width, 29 inches; assay value, 9·3 dwts. The expenditure on capital account amounted to £30,,374. The native labour force at the end of the quarter was 18,742, as compared with 15,549 at the end of September, 1915.

City Deep.

The reef disclosures were as follows:—Main Reef: Distance sampled, 2,125 feet; width, 46 inches; assay value, 2·9 dwts. Main Reef Leader: Distance sampled, 3,865 feet; width, 25 inches; assay value, 19·7 dwts. South Reef: Distance sampled, 290 feet; width, 34 inches; assay value, 12·5 dwts. The capital expenditure for the quarter amounted to £11,849, leaving a sum of £55,980 to be spent on authorised work.

Modderfontein B.

The reef disclosures were as follows:—Main Reef: Distance sampled, 2,543 feet; width, 22 inches; assay value, 22·1 dwts. The tonnage milled for the quarter has averaged 45,000 tons a month, and the working profit increased £15,750 as compared with the preceding quarter. The value of the ore mined was still somewhat higher than that called for by the ore reserves; at the same time, there has been a general reduction in stoping width, which has favourably affected the mine grade. Development operations were extended, and the reef disclosures were on the whole satisfactory. Capital expenditure for the quarter amounted to £1,252, mainly in connection with the native village, which is now completed and will be gradually occupied.

Geldenhuis Deep.

The reef disclosures were as follows:—Main Reef: Distance sampled, 1,526 feet; width, 26 inches; assay value, 8·1 dwts. Main Reef Leader: Distance sampled, 477 feet; width, 10 inches; assay value, 16·6 dwts. South Reef: Distance sampled, 1,323 feet; width, 17 inches; assay value, 20·1 dwts. The profit shows a considerable improvement as compared with the last quarter on account of the increased tonnage that has been milled. The native labour supply is satisfactory.

Ferreira Deep.

The reef disclosures were as follows:—Leader: Distance sampled, 431 feet; width, 16 inches; assay value, 19 dwts.; valued at 79s. 10d. South Reef: Distance sampled, 470 feet; width, 12 inches; assay value, 28 dwts., valued at 117s. 7d. Development operations on both reefs continued to expose satisfactory values, those on Leader showing improvement over the previous quarter. Work in connection with the reorganisation of No. 2 shaft continues, and at December 31 there remained 212 feet to connect the portion of the vertical between the 3rd level, where sinking full size is progressing, and the 7th level, where a small size connection is being risen. The results for the quarter show considerable improvement in profit, owing to the improved yield per ton milled, but the costs were affected by abnormal expenditure in connection with the No. 2 shaft reorganisation. The native labour position remains satisfactory.

Durban Roodepoort Deep.

The reef disclosures were as follows:—Main Reef: Distance sampled, 1,275 feet; width, 21 inches; assay value, 12·1 dwts. South Reef: Distance sampled, 1,385 feet; width, 6 inches; assay value, 47 dwts. Development operations resulted in a further improvement in footage, including an increase in shaft sinking. The exposures on both reefs continue generally satisfactory, although a reduction in value is shown in Main Reef. During the quarter the main ore bin on the 12th level No. 1 shaft was completed and animal traction installed on the 12th (main connecting) level, thus allowing of some measure of concentration of hoisting to No. 1 shaft. A slightly increased profit is shown for the quarter, and with the completion of the work on the 12th (main connecting) level, which will enable a larger percentage of South Reef to be mined, a further improvement should be obtained. The native labour position continues satisfactory. There is a credit on capital account for the quarter of £990, as advantage was taken of the present demand for second-hand machinery to dispose of certain portions of the plant no longer required.

New Modderfontein.

The report of the directors of the New Modder for the quarter ending 31st December, 1915, shows that the number of feet driven, sunk and risen, exclusive of stopes, was 2,884 feet. The reef disclosures were as follows:—Main Reef: Distance sampled, 2,161 feet; width, 9 inches; assay value, 51·9 dwts., valued at 218s. Ore received from mine, 196,653 tons; ore received from surface dumps, 1,330 tons; waste sorted out, 17·8 per cent.; tonnage crushed, 157,500 tons; number of stamps operating, 180; number of tube mills operating, 7. Value of ore before crushing (reflected by mill yield and value of pulp): Mill yield per ton, 28s. 6d.; assay value of pulp, 14s. 9d.; total, 43s. 3d. (the value per ton is calculated at 84s. per fine oz.). Total yield, 77,791 ozs. fine; total yield per ton, 41s. 1d. The operations for the quarter were satisfactory, and the profit earned shows an increase when compared with the previous quarter. Development operations were curtailed in the circular shaft section whilst the permanent air and water mains and cables were installed in the shaft. This work has been successfully completed, and development has been re-started. The capital expenditure for the quarter totalled £16,130. The board regrets that, as the Imperial Treasury declined to give its consent to the sub-division of shares, it felt that at the extraordinary general meeting convened for the purpose of considering the proposal, the only course open was to recommend shareholders not to adopt the resolution at present, although, of the proxies received, a preponderating number were in favour of the sub-division. This course was followed at the adjourned meeting, held on the 21st January, 1916, when the resolution was rejected.

Robinson.

The report of the directors of the Robinson for the quarter ending 31st December, 1915, shows that the ore received from mine was 166,493 tons; ore received from surface dumps, 15,326 tons; waste sorted out, 2·5 per cent.; tonnage crushed, 176,700 tons; number of stamps operating, 250; number of tube mills operating, 6. Value of ore before crushing (reflected by mill yield and value of pulp): Mill yield per ton, 16s. 10d.; assay value of pulp, 10s. 4d.; total, 27s. 2d. (the value per ton is calculated at 84s. per fine oz.). Total yield, 53,839 ozs. fine; total yield per ton, 25s. 4d.

Village Deep.

The report of the directors of the Village Deep for the quarter ending 31st December, 1915, shows that the number of feet driven, sunk and risen, exclusive of stopes, was 5,246 feet. The reef disclosures were as follows:—Main Reef Leader: Distance sampled, 1,230 feet; width, 23 inches; assay value, 13·5 dwts., valued at 56s. 8d. South Reef: Distance sampled, 1,006 feet; width, 22 inches; assay value, 8·2 dwts., valued at 34s. 5d. Ore received from mine, 181,452 tons; waste sorted out, 12·1 per cent.; tonnage crushed, 158,600 tons; number of stamps operating, 180; number of tube mills operating, 7. Value of ore before crushing (reflected by mill yield and value of pulp): Mill yield per ton, 19s. 9d.; assay value of pulp, 9s. 11d.; total, 29s. 8d. (the value per ton is calculated at 84s. per fine oz.). Total yield, 54,814 ozs. fine; total yield per ton, 28s. 9d.

Operations for the quarter call for no special comments, the total working profit showing little variation from the preceding quarter. Development operations show an increase of 1,013 feet, with reef disclosures showing little variation. The results from the extensive work done in exploring the South Reef have been disappointing, and development in this reef will, from now on, be curtailed. Capital expenditure for the quarter totalled £1,324, mainly in connection with the extension to slime plant. Machinery sold realized £1,186, the nett expenditure being therefore £138. The unexpended amount on authorised votes is £3,962. The native labour position has been satisfactory. The ore reserve position is being re-calculated as at December 31st, 1915.

Rose Deep.

The report of the directors of the Rose Deep for the quarter ending 31st December, 1915, shows that the number of feet driven, sunk and risen, exclusive of stopes, was 3,834 feet. The reef disclosures were as follows:—Main Reef: Distance sampled, 786 feet; width, 24 inches; assay value, 5·5 dwts., valued at 23s. 1d. Main Reef Leader: Distance sampled, 386 feet; width, 28 inches; assay value, 6·1 dwts., valued at 25s. 7d. South Reef: Distance sampled, 618 feet; width, 26 inches; assay value, 6·3 dwts., valued at 26s. 6d. Ore received from mine, 237,588 tons; waste sorted out, 13·1 per cent.; tonnage crushed, 207,400 tons; number of stamps operating, 300; number of tube mills operating, 7. Value of ore before crushing (reflected by mill yield and value of pulp): Mill yield per ton, 15s. 2d.; assay value of pulp, 10s.; total, 25s. 2d. (the value per ton is calculated at 84s. per fine oz.). Total yield, 58,965 ozs. fine; total yield per ton, 23s. 7d.

Nourse Mines.

The report of the directors of the Nourse Mines for the quarter ending 31st December, 1915, show that the number of feet driven, sunk and risen, exclusive of stopes, was 7,160 feet. The reef disclosures were as follows:—Main Reef: Distance sampled, 900 feet; width, 55 inches; assay value, 7·7 dwts., valued at 32s. 4d. Main Reef Leader: Distance sampled, 1,360 feet; width, 21 inches; assay value, 8·1 dwts., valued at 34s. 2d. South Reef: Distance sampled, 1,916 feet; width, 36 inches; assay value, 9·0 dwts., valued at 37s. 10d. Ore received from mine, 199,436 tons; waste sorted out, 13·6 per cent.; tonnage crushed, 172,700 tons; number of stamps operating, 260; number of tube mills operating, 7. Value of ore before crushing (reflected by mill yield and value of pulp): Mill yield per ton, 16s. 11d.; assay value of pulp, 8s. 1d.; total, 25s. (the value per ton is calculated at 84s. per fine oz.). Total yield, 49,669 ozs. fine; total yield per ton, 23s. 11d. The profit for the quarter showed an increase of £8,598, due to a reduction of 5d. per ton milled in working costs and an increase of 7d. per ton in the yield. The amount of development work was well maintained, without any marked change in the quality of ore exposed. The capital expenditure for the quarter amounted to £196, whilst machinery to the value of £418 was sold. The authorised unexpended balance on capital account is £4,269, of which £4,028 is in connection with additions to pumping equipment to cope with water in the deeper parts of the mine. The native labour position is satisfactory, and it is to-day possible to break a greater quantity of ore by hammer stoping than at any period in the history of the mine.

Dr. Arthur William Rogers, Assistant Director of the Geological Survey Branch of the Department of Mines and Industries, has been confirmed in his appointment as Acting Director of the Geological Survey, with effect as from January 1. Dr. E. T. Mellor will be Acting Assistant Director.

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THE POSITION OF THE CITY AND SUBURBAN.

Points from the Annual Reports for 1915.

In his annual report for 1915, Mr. Percy Cazalet, the Consulting Engineer of the City and Suburban, writes:—Speaking generally, the year shows satisfactory increases over the results for 1914, as will be seen from the following tabulation of results for the past four years:—Development footage: 1912, 8,301 ft.; 1913, 13,685 ft.; 1914, 10,965 ft.; 1915, 9,445 ft. Tons mined: 1912, 367,368 tons; 1913, 340,240 tons; 1914, 358,213 tons; 1915, 380,397 tons. Sorted: 1912, 11.9 per cent.; 1913, 9.8 per cent.; 1914, 9.5 per cent.; 1915, 11.4 per cent. Milled: 1912, 323,934 tons; 1913, 306,663 tons; 1914, 324,117 tons; 1915, 335,979 tons. Yield per ton milled: 1912, 38s. 5.5d.; 1913, 39s. 4.3d.; 1914, 36s. 2.8d.; 1915, 36s. 1.5d. Cost per ton milled: 1912, 21s. 7.7d.; 1913, 21s. 10.1d.; 1914, 20s. 10.8d., 1915, 21s. 3.0d. Total working profit: 1912, £276,593; 1913, £268,481; 1914, £248,551; 1915, £249,880. The tonnage mined and milled and percentage sorted all show fair increases for the year, and the tonnage milled is the highest ever accomplished on your mine. The yield recovered, practically identical with the preceding year, has been detrimentally affected by the increased cost of gold realisation due to the war. Costs show an increase of only 4.2d. per ton milled, which, when it is remembered that costs are variously calculated to have been affected to the extent of from 8d. to 1s. per ton by increases directly due to the war, can be considered satisfactory. Mining and mine general costs show increases of 4.7d. and 2.8d. per ton, respectively, and development and reduction show decreases of 2.7d. and .6d. per ton, respectively. Costs included the replacement of the air main in the incline shaft, which was worn out, and the installation of an additional pump for the 30th level. The working profit, owing to the increased tonnages handled, shows an increase of £1,329, in spite of the increased costs mentioned and the decrease in yield due to gold realisation charges being so much higher. Capital expenditure has remained at a low figure, £1,553 8s. being spent thereon during the year. The ore reserves have been re-estimated as at 31st December, 1915, and give the following results:—Leader: 539,600 tons, value 9.2 dwts. =38s. 8d. South Reef: 97,800 tons, value 8.0 dwts.=33s. 7d.; total, 637,400 tons, value 9.0 dwts.=37s. 10d. The estimated stoping widths over which these reserves have been calculated are: Leader 51 inches and South Reef 50 inches, as compared with 50 inches and 49 inches, respectively, for 1914. The foregoing reserves, consisting wholly of blocked ground, can be segregated as follows: (a) Presently available for stoping: 440,200 tons, value 8.8 dwts.=37s.; (b) Shaft pillars, 197,200 tons, value 9.4 dwts. =39s. 6d.; total, 637,400 tons, value 9.0 dwts.=37s. 10d. Compared with the previous year these reserves show a decrease of 121,300 tons, with an increase in value of 0.5 dwt. per ton. The same remarks as made in my last year's report anent Main Reef and accumulations of low grade ore hold good, namely, that some of both these classes of ore will be drawn on at a profit before the mine is exhausted, but that this amount cannot be assessed at the present time.

The "Pyritic Seam."

A careful examination has been made of some of the old Main Reef workings for exposures of a bed which has been called the "Pyritic Seam," and has been met with on neighbouring mines in this horizon, sometimes carrying very good values. Such seams have been found on your mine overlying the Main Reef proper in a number of places, but so far, although high values are met with at times, no strike of importance has to be reported. Where sufficiently exposed to allow of a judgment being formed, the net result is that some small areas of Main Reef which were just below the pay limit may now be expected to show results slightly above this point. The development on the Leader on the lower levels has continued to expose ore of high grade, some 159,200 tons having been developed during the year at a value of 12.2 dwts., all of which was payable. Much of this development took place in the claims purchased from the City Deep, Limited, during 1913, which ground is opening up exceedingly satisfactorily. It has not yet proved possible to define exactly the boundaries of this purchase, as the course of the fault which is to form your new eastern boundary has not been finally located. The South Reef has continued, where exposed, to open up unsatisfactorily, and again no payable ore was developed during the year on this reef.

Sand Filling.

An increased amount of sand filling was accomplished, 39,535 tons being packed in the workings underground. In addition to this sand filling, "reef-packing" is being applied to the support of the stopes on the lower levels since September last, and some 6,243 tons of broken ore have been so utilised to the end of the financial year; the cost of breaking and packing this ore is included in the year's working costs. This system, which has proved so beneficial in heavy ground wherever tried, will be extended to such of the lower level stopes of your mine as require special treatment. Stoping operations have been much more confined to the ore-reserves in the lower levels than in past years owing to the practical exhaustion of the upper level ore from old stopes, which have been systematically gone through during the past few years. The result of this has been that the percentage of ore mined from the ore reserves has increased by some 17 to 18 per cent. for the year, and a further increase may be anticipated during 1916, the result of which should be to give a higher yield per ton, owing to the good values now met with in the lower levels. Recruiting for both the German South-West and now the German East African campaigns has affected the supplies of skilled white men available for the mines very considerably, and were any more men to leave the staffs and skilled ranks the output position would be detrimentally affected. The Manager and staff have in consequence had a very serious strain placed upon them in continuing to carry on mining operations with regularity and safety.

The Manager, Mr. C. Glyn, writes, *inter alia*:—

General.—Revenue obtained from township licences amounted to £2,285. The profit was £1,329 more than that of the previous year. The ore reserves stand at 637,400 tons, valued at 9.0 dwts. This tonnage is a decrease of 121,300 tons compared with last year, but the value shows an increase of 0.5 dwt. per ton. A larger tonnage was mined from the ore reserves, and it is to be expected that they will show a further gradual decrease. 45,205 tons of Main Reef were mined during the year, having a value of 5.5 dwts., and reclamation accounted for 47,432 tons. The total development footage was 1,500 feet less than last year. The total depth of the incline from the surface is 6,377 feet, and there remain approximately 600 feet still to sink. The 37th level station and ore bin are being cut and this work will shortly be completed. The reef exposures on the Leader have been good on the lower levels, but the Main Reef exposures have been poor, and very little can be expected from this reef on these levels. The South Reef was intersected on the 29th, 31st, 32nd and 33rd levels and the values were disappointing. It was decided to purchase a new air compressor in order to avoid the expense of running a night shift. This has been ordered and should arrive shortly. An addition had to be made to the transformer house and a small amount was spent on the pumps to be installed on the 38th level. The total capital expenditure amounted to £1,553, and there is a balance of £10,627 still to be spent on authorised votes.

WANTED.—Antimony Mine; state location, character and quantity of ores and full particulars. Address Manufacturer, Station C, New York, U.S.A.

Correspondence and Discussion.

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal—Views, Suggestions and Experiences of Readers.

State Mines' Prospects.

To the Editor, *South African Mining Journal.*

Sir,—In your issue of Feb. 12, you draw attention to an inaccuracy in the valuation of State Mines shares given by the *Statist;* you speak of 25s. grade, working costs 17s. 6d. and profit 6s. 6d. There is evidently a missing shilling; the company would receive about 5s. per ton. With working costs between 16s. and 20s. and grade 25s. upwards, the company practically gets 5s. per ton (sometimes a penny or two less and sometimes more); recent development points to a grade of 25s. upwards as likely. It should be noted that before the Government's share of profits is calculated, allowance must be made for exhaustion of capital. On a basis of 110,000 tons monthly and profit to the company of 5s. per ton, reduction of debt at 10 per cent. per annum, plus interest on debt, the company should be able to pay 17½ per cent. per annum before free from debt and more after.—Yours, etc.,

VICTOR G. SALMON.

Johannesburg,
17th February, 1916.

The Karroo Coal Controversy.

To the Editor, *South African Mining Journal.*

Sir,—It is abundantly obvious, I think, from the correspondence you have published, that the problem of the alleged Karroo coal is one of extreme scientific interest. One feels reluctant to add anything further to the discussions, however, because of the absurd and quite unjustifiable attitude taken up by Mr. Chambers with regard to those who do not agree with his particular views upon the subject. He appears to assume that any criticism of his opinions is merely a disguised attempt to hinder local industrial enterprise. If, as he maintains, his "coal" is a commercially valuable product, no amount of difference of opinion as to its real nature is likely to prevent it being sold for industrial and domestic purposes. In his letter which appeared in the last issue of the *S.A. Mining Journal*, Mr. Chambers quotes some analyses of the "coal," and leaves it to your readers to judge whether he is justified in calling it a coal or not. As I have said before, I cannot see that these analyses settle the question at all. Of course, much depends upon the definition of coal; or, as your correspondent, Mr. Stanley Nettleton, says, "What is coal?" A rough and partial definition which would suit the present case, and would, I think be accepted by Mr. Chambers, would be as follows:—"Coal is a stratified deposit which is practically entirely of vegetable origin, and has been accumulated either in peat bogs as the result of the heaping up of successive generations of plants in successive layers, or in lakes or lagoons, as floated material which has gradually sank to the bottom." If transferred bodily in any way to new surroundings, as Mr. Chambers suggests, it would still be coal, if its structural and chemical characters remained the same or nearly so. In a previous letter, however, he indicates distillation, as well as pressure, as a means by which the material has been forced into the extensive lines of fissuring where it is now found. The products of distillation would certainly not be coal, according to the provisional definition I have given above. It would be interesting to know how Mr. Chambers would differentiate between what has been merely forced into the fissures and what has been distilled into them. His latest description of the occurrence does not make it any more clear how coal could possibly be forced into the fissures, and obviously there is an important difference between "lines of schistosity or stratification." Neither is the quotation from Professor Beeby Thompson's book very helpful in the circumstances. Between Wurtzilite, for example, and oil asphalt, there is a very wide difference in the matter of solubility in the various solvents used, the latter being almost whole soluble in each, and the former practically insoluble or only to a small percentage. Each, nevertheless, is classed in the category of solid bitumens. I should like to suggest to Mr. Chambers, as a more or less effective way of deciding the question at issue, that a microscopic examination of his "coal" should be made by means of a thin section. It would perhaps be a very difficult thing to do here, but a skilled microscopist, such as Mr. Weber, of the Geological Museum, would doubtless be able to accomplish something useful. In this connection, I may refer to an interesting paper upon the subject of the composition and qualities of coal, as shown in thin sections, which was contributed by Edward C. Jeffrey to No. 8, Vol. ix., of *Economic Geology*, which was published in December, 1914, and will probably be found in the Seymour Library.—Yours, etc.,

J. E. MILLS DAVIES.

National Diamonds.

To the Editor, *South African Mining Journal.*

Sir,—I should like to be permitted, through the columns of your valuable paper, to ask the numerous shareholders of National Diamonds, if they are aware of the fact that the recently floated Stella Diamonds are really the National Diamond Mines, No. 2, *alias* the old Schuller Mine. Ought not the public to demand that some explanation be given of the fact that in the Stella prospectus all reference to the work of the National Diamonds appears to be absolutely avoided. The operations are said to have been a failure, and for that reason, amongst others, the late owners are supposed to have been compelled to abandon the property. If this is true, which I very much doubt, how is it that this National Diamond Mine, No. 2, is a "soundly payable" one under the new management, which is said to have proved 200 claims? Why is the vendor's name not disclosed?—I am, etc.,

NATIONAL SHAREHOLDER.

[We have deleted certain passages from this letter.—Ed.]

Coalfields' View of the Truck Shortage

To the Editor, *South African Mining Journal.*

Sir,—The inadequate supply of empty trucks to deal with the output of coal continues to attract more attention in the Witbank district than any other coal trade question at present, although there are several burning questions giving rise to much discussion in colliery circles just now. It may be pointed out that the collieries in the Middelburg district suffer probably more keenly from the scarcity of empties than those in other districts, and with the present low prices of coal a single day lost per week is a serious loss for the collieries. To the war is generally attributed the scarcity of rolling stock on the railway, as it has caused delay in the execution of the orders for new rolling stock; but it must not be overlooked that but for the war the yearly coal output of the Transvaal alone would be to-day a million tons in excess of present figures, and where would the railway be then? Twenty-four years ago there was a more pronounced scarcity of empty trucks than to-day, and the gold mines were only with difficulty kept going; but the Z.A.S.M placed such large orders for trucks that never again was that administration blamed for failing to gauge the truck requirements of the collieries, because, as a matter of fact, they erred quite as much in the opposite direction. It must not be forgotten that up to the outbreak of the European war the coal output of the Transvaal alone was year by year increasing at an average rate of 10 per cent., and one would have thought that the Railway Administration would have taken such steps as would have provided at least a similar increase in the supply of empty trucks. Then again, the change over from steam to electricity at the gold mines instead of relieving the strain on the railways as predicted, and bringing ruin to the collieries, has had quite the contrary effect, as the Power Stations have been equipped with boiler arrangements calling for the consumption of fines, which previously went to the colliery waste heaps. On the other hand, there has been no difficulty experienced by the collieries in placing the round steam coal so displaced to advantage in other markets, thanks to the far-seeing Railway Administration reducing the railway rates for coal to distant markets. It is probable that had the Railway Administration kept up the old railway rates for the carriage of coal to such markets as Kimberley, Bloemfontein, East London, Port Elizabeth, Capetown, and the Western Province, not to mention the rebate granted on bunker and export coal, the collieries would to-day be bewailing the scarcity of orders rather than the scarcity of empty trucks. It has been already stated that the Power Stations on the Rand have supplied an outlet for the fine coal produced at the collieries previously going to the waste heaps without causing a decline in the demand for round coal. This means that the railway has been called upon to carry at least a 10 per cent. increase in tonnage from the Middelburg Coalfield to the Rand, and with the displaced round coal having to find an outlet in more distant markets, there can be little wonder expressed that such an abnormal strain should be thrown upon the Railway. However, as stated in your last week's " Notes and News," the Railway Administration is endeavouring to improve the position by taking such steps as will, it is hoped, put an end to much of the abuse that exists in the wasteful requisition and use of trucks with the view of adding to the earning capacity of the rolling stock, and so reduce the dearth of empties to a minimum. Even the Stationmasters are being rounded up and demurrage charges inflicted without the least consideration for the offenders, whilst the discretion hitherto granted to Stationmasters in the infliction of demurrage charges seems almost to have become a thing of the past.—I am, etc.,

" V."

ANSWERS TO CORRESPONDENTS.

All inquiries addressed to the Editor must bear the writer's name and full address. We cannot reply to inquiries by letter, but telegrams with replies prepaid will be answered. Correspondents are requested to write their names and pseudonyms distinctly.

" F.G."—The company paid its first dividend of 1s. in 1914, and for last year 2s.

" Holder."—(1) The dividend is usually declared in April and October. (2) The same as for the last two years.

"F.J.S." (Komatipoort).—(1) Yes. (2) The whole matter is fully explained in the speech of the Chairman, printed in this issue, and in our comments thereon under " Notes and News."

' E.R."—The only reasons are the reduced dividends and the poor profits for December.

" C.M."—The company holds 253,500 Brakpans and 250,000 Springs, apart from the township, licences, and the colliery.

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" J. J. M." (Randfontein).—1, London Wall Buildings, and Corner House, Johannesburg.

" William " (Bulawayo).—(1) As a lock-up, yes. (2) Both good—impossible to measure merits exactly. (3) Safe enough.

" Lion."—The mine is opening up excellently in depth, and a good return for February is expected.

" Hopeful."—Nothing is known by the directors, and you seem to have been misinformed.

" S.F."—The ore reserves are being recalculated. They are certain to show an improvement.

" V." and " S.N."—Letters received too late for insertion in this issue.

" Anxious."—According to the best authorities, everything depends on the duration of the war and the subsequent financial situation, as to which there is no modern precedent to form any sort of guide. It seems fairly evident, however, that there will be something in the nature of a scramble for financial accommodation the world over, and that high rates will be demanded and readily paid. This will tend to keep the prices of existing good-class securities down. It must not be overlooked, however, that returning confidence after the war will bring money out of hoards in large quantities, and, to some extent, counteract the upward tendency of money. This actually happened after Waterloo, and in spite of the revolutionary change, in the financial conditions, it is quite on the cards that it may happen again.

" Puzzled."—About a year ago, the Chancellor of the Exchequer appointed the Committee to consider and advise upon new issues of capital. The committee consists of the Right Hon. Viscount St. Aldwyn, chairman (formerly Chairman of the Bank of Africa); Lord Cunliffe, Governor of the Bank of England; Sir Frederick Banbury; the Right Hon. Sir Thomas Whittaker; and Mr. G. Stapylton Barnes, of the Board of Trade.

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REVENUE ACCOUNT for the Year ended 31st December, 1915.—Ordinary Department.

Funds at the beginning of the year...	£357,949 19 11
Renewal Premiums (less re-assurances), including deferred instalments of Annual Premiums, less Commission thereon	131,250 16 2
Premiums on 3,901 Policies assuring £1,332,725 and yielding an Annual Revenue of £49,597 17s. 5d., including deferred instalments of Annual Premiums (less Commission thereon)...	41,578 12 3
Interest	21,124 18 7
Supplementary Contracts ... ... Endowments matured as per contra*	500 0 0
	£552,404 6 11

Death Claims and Bonuses...	£27,281 7 6	
Disability Protection Assurance—		
Premiums allowed Policyholders...	23 5 0	
Cash Payments	500 0 0	
Child's Deferred Assurance—		
Premiums Refunded...	30 13 6	
Endowments matured, plus Bonuses... Including £500 under Supplementary Contracts.	3,453 0 0	
Surrenders and Changed Policies ...	16,541 13 9	
Interest on Supplementary Contracts...	175 0 0	
		£48,004 19 9
Commission—		
New Business	27,292 5 4	
Renewals	7,705 13 11	
Travelling Expenses...	12,540 8 0	
		47,538 7 3
Management Expenses—		
Directors' Fees	264 12 0	
Advertising	435 18 6	
Medical Fees	3,335 2 6	
Salaries	8,373 18 3	
Rent	989 0 0	
Licences	1,136 0 0	
General Expenses...	1,922 15 8	
Legal Charges	127 12 7	
Audit Fees	350 0 0	
Actuarial Fees	452 10 0	
Printing and Stationery	1,106 19 8	
		18,494 9 2
Income Tax—		
Assessment to 30th June, 1915 ...		1,278 16 11
Reserve for Depreciation of Investments		2,000 0 0
Written Off—Office Furniture and Plant		212 9 6
Amount of Funds at 31st December, 1915		434,875 4 4
		£552,404 6 11

* Amount of Assurance which matured during the year, but which, according to the conditions of the Policy, was not payable at once, but is to be held by the Society at Interest and paid at a later date.

REVENUE ACCOUNT for Nine Months ended 31st December, 1915.—Industrial Department.

Premiums, including outstanding Premiums, less Commission thereon	£20,927 18 11
	£20,927 18 11

Claims by Death		£1,745 4 1
Management and Agency Expenses—		
Agents' and Superintendents' Commission and Salaries...	£30,768 14 3	
Office Salaries	2,148 6 5	
Travelling Expenses	670 4 1	
Rent	333 9 0	
Printing and Stationery	1,575 13 7	
Advertising	149 6 6	
Duty Stamps, Postages and Telegrams	570 16 11	
Medical Fees	143 7 6	
General Expenses	812 18 11	
	37,172 17 2	
Less Amount transferred to Establishment Account	18,130 0 0	
		19,042 17 2
Written Off—Furniture and Fittings...		139 17 8
		£20,927 18 11

BALANCE SHEET as at 31st December, 1915.

LIABILITIES.

Capital—		
25,000 Shares at £1 each...	£25,000 0 0	
Assurance Fund...	409,875 4 4	
Total Funds as per First Schedule		£434,875 4 4
Medical Fees		235 4 0
Sundry Creditors		78 6 0
Premiums in Suspense...		1,239 11 1
Agents' Balances...	627 0 7	
Agents' Guarantee—Industrial Department...	3,064 8 1	
		3,691 8 8
Claims Outstanding—		
Ordinary Department	7,353 7 6	
Industrial Department...	93 4 0	
		7,446 11 6
Premiums Paid in Advance		25 0 2
Interest Paid in Advance		1,784 8 6
		£449,375 14 3

ASSETS.

Government and Municipal Stock... ...	£31,574 7 6	
Less Reserve for Depreciation ...	4,500 0 0	
	£27,074 7 6	
South African Municipal Loans	64,000 0 0	
		£91,174 7 6
Loans on First Mortgage		182,549 6 0
Cash at Bankers and on Hand		13,766 6 2
Loans on Policies (within Cash Value)		70,110 12 2
Agents' Balances (Ordinary Department)		15,170 12 9
Office Furniture, Plant and Stationery		6,257 10 10
Outstanding Premiums (less Commission thereon)—		
Ordinary Department...	37,964 2 9	
Industrial Department	2,968 1 5	
		40,932 4 2
Sundry Debtors		467 18 5
Premiums in Transit (Ordinary Department)		534 0 11
Interest Accrued		882 15 4
Establishment Account—		
Ordinary Department	9,500 0 0	
Industrial Department...	18,130 0 0	
		27,630 0 0
		£449,375 14 3

J. A. MACRAE, Manager,

29th January, 1916.

I. W. SCHLESINGER, Managing Director.
RICHARD BAUMANN, Chairman.

ALEX. AIKEN & CARTER, Incorporated Accountants.

Company Meetings.

THE MESSSINA (TRANSVAAL) DEVELOPMENT COMPANY, LTD.

The Company now getting into its Stride—An Interim Dividend Anticipated early Next Year—Taking Advantage of Good Prices for Copper—The Excess Profits Tax.

The annual ordinary meeting of the shareholders of the Messina (Transvaal) Development Co., Ltd., was held at Salisbury House, London Wall, London, E.C., on Thursday, November 25th, 1915.

Mr. H. C. Hoover (a director of the company), presided in the absence of the Chairman, Mr. C. F. H. Leslie.

Mr. A. A. Kelsey, F.C.I.S. (Secretary), read **the notice** convening the meeting and the report of the auditors.

MEETING UNDER FAVOURABLE CIRCUMSTANCES.

The Chairman: Gentlemen, I regret to tell you that Mr. Leslie has been taken very ill, and is unable to preside over this meeting. He had, however, prepared notes for his address, and I am simply going to read them to you, as being what he would have told you had he been here. Mr. Leslie says:—I am happy to say that we meet to-day under far more favourable circumstances with regard to this company than the most optimistic of us could have anticipated a year ago. On June 30, 1914, our current liabilities exceeded our liquid assets by about £75,000. If you will refer to the balance sheet before you, you will note that the liquid assets as on June 30, 1915, exceeded the current liabilities by about £31,000. Incidentally, we have been able to clean up the balance sheet by writing down dead assets; and I think we may congratulate ourselves that there is not much now left to do in this respect. As to the position of the various securities—we have dealt with them as fully as we were able in the directors' report. We have had to face the fact that present conditions are unfavourable to the realisation of such assets, and also to their value, and everything we can tell you, beyond what we told you last year, is contained in our report.

CANADIAN AGENCY LOAN ACCOUNT.

So far as the loan against the debentures of the Canadian Agency is concerned, the intrinsic position has been supplied to us by our solicitors, and I will read to you a short statement. I may say that we are about to go into Court over this matter, and we do not think it a subject that we can discuss now at great length with advantage to the company. The solicitors state that on June 6th, 1914, the Canadian Agency went into liquidation. Under the powers conferred on them by the Trust Deep, certain of the debenture stock holders immediately appointed Sir William Plender to be Receiver. So many questions, however, arose requiring decisions of such far-reaching importance, that Sir William Plender, not unnaturally, desired to have the protection of the Court to cover his responsibilities in the matter. Accordingly, on August 19th, 1914, an Order of the Court was obtained appointing him Receiver for the debenture stockholders. There is, as you are probably aware, a claim by the liquidator that the company's debenture stock is invalid. It is not necessary for us here to go into the grounds of this claim, nor can we, as the case is "sub judice," discuss the legal position at a public meeting such as this. It is, however, I think, a matter of common knowledge that a dispute as to the validity of debenture stock is generally a somewhat protracted affair, and this case has certainly proved no exception to the rule. The company's solicitors, however, inform me that they are in a position to set down the case for hearing; and, consequently, it is hoped and expected that the issue will be tried probably this term. It is simply a question of the state of the Judge's List to say when, exactly, the hearing will take place.

AMOUNT COLLECTED BY THE RECEIVER.

I think it would be no indiscretion for me to say that the amount of money collected up to the present time by the Receiver is in the neighbourhood of £28,000. Similarly, I may tell you that there is quite a reasonable probability, according to the Receiver's estimate, that another £15,000 to £20,000 appears to be capable of collection in due course. On the other hand, although £500,000 of this debenture stock was issued, the large majority of debenture stock holders have already consented to waive their claim to any participation as debenture stock holders in the assets collected by the Receiver; in fact, I think I am justified in saying that considerably over 50 per cent. of the registered stockholders have already signified their intention of not prosecuting any further their claim to any distribution in the assets collected by the Receiver. This whole question very materially affects the recoveries which we may make. If our charge should be declared valid, there is a considerable sum of money which we should be able to recover.

IMPROVED FINANCIAL POSITION.

As to the present position of the Messina Company, you will perhaps recollect that at the end of 1914 the overdraft at our London bankers amounted to about £80,000. You will see from the balance sheet in front of you that this had been reduced to £27,000 by June 30th. I may further inform you that since the date of this balance sheet the overdraft due to our bankers in London has been paid off, and we have a credit balance there of about £49,000 in cash. We also have a quite considerable credit balance in South Africa on current account—the only money now owing in South Africa being the advances made from time to time on products in transit, which are repaid out of the first realisations of the metal as it comes forward. Having now dealt with the financial position of the company, I come to the position of the mine itself, and I will first call your attention to Mr. Kuehn's report. There was some difference of opinion with Mr. Emery, who had been sent out as the manager of the mine, as to the position and value of the ore reserves, and Mr. Kuehn was sent out to check the matter. I am somewhat disappointed with Mr. Kuehn's estimate of the ore reserves; that is, in my opinion, the weak point of an otherwise magnificent position. We have to remember, however, that Mr. Kuehn is like everyone else—he does his best to avoid over-stating his case. Whether he under-states it or over-states it, the fact remains that you cannot get more out of the mine than there is in it. In consequence of this, now that the financial position admits of this policy, we are taking energetic steps to develop the mine itself and some adjacent prospects on the property. It is too early to speak of results at present; but the prospects are quite promising, and we have great hopes of improving the position of the ore reserves by these means, because Mr. Kuehn has not in his estimate of the reserves included any tonnage for increase in depth, or laterally, or for surface prospects. We know of no reason why the mine should not go down to much greater depths than we have reached at present. In fact it is all in favour of continuity in depth that the quality of the ore at the 9th and 10th levels has not changed, and that the same rich bands of bornite and chalcopyrite appear to make up the ore in the pay shoots. It seems to me probable, however, that in such a mine as this, where rich and poor ore lie close together in relatively small shoots, there will come out of the mine more than any expert, however knowledgeable, can see. I think you may be quite hopeful on this point.

IMMEDIATE OUTLOOK.

It is true that the two principal ore bodies—the Bonanza hanging wall and footwall—show a noticeable decrease in size; but this phenomena of decreased width has happened in some of the higher levels, and will probably happen again, and we do not attach great importance to it for the next 200ft. or 300ft. It leads us, however, to suppose that the present rate of output may not be indefinitely maintained; but, as we are deliberately pressing the mine output, in view of the present price of copper, we must not complain or be disappointed if we have, say in about 12 months' time, to be content with a lower output than we are now getting. It is obvious that our experts cannot control the amount of ore which exists in this or any other mine; and this axiom brings me to my next point, which is, perhaps, the most important one affecting the company. Although the quantity and assay value of ore existing cannot be controlled, it is possible, by utilising the latest experience of successful metallurgists to control to a great extent the recovery of copper from that ore, and by various means to increase the amount of ore which can be handled at the mill in any given period. Mr. Emery went out to Messina in August, and formally took up his position as general manager at Messina in December of last year, and he has succeeded in effecting the following improvements: He has increased the sorting and milling capacity of the plant from 20 per cent.

to 25 per cent., so that it can now handle 10,000 tons a month. This enables us to press the mine output at a time when copper prices are favourable. He is, we believe, well on his way towards getting an extraction of 90 per cent. of copper from that ore, as compared to an extraction of 74 per cent. obtained in December last. This increased extraction has been obtained from a lower grade ore than was available in December last, and, calculated on an annual output of 5,000 tons of copper, is equivalent to an additional profit for the company, at present prices, of something approaching £60,000 per annum, as compared to our former milling practice. This point seems to me to be so remarkable that I will endeavour to put it into other words. We will assume that we are sending to the sorting and milling plant 90,000 tons of ore per annum, of the assay value of 7 per cent. in copper. This will give the total copper contents of the 90,000 tons of ore as 6,300 tons. On the basis of 74 per cent. extraction of copper we should obtain 4,662 tons of copper to market. On the basis of 90 per cent. extraction, the amount of copper recovered would be 5,670 tons, or an additional 1,000 tons. Hence this 1,000 tons would be obtained practically free of cost, except for the extra freight and realisation charges involved.

A REMARKABLE POSITION.

On the basis of the present prices and output you are, therefore, obtaining a further £60,000 a year of net revenue for an expenditure on plant and machinery of not exceeding £5,000. (Applause.) You will gather from the reports, and from what I have said, that the perspective of the whole proposition has changed since last year. Owing to improved metallurgical methods, we are obtaining more copper from the same amount of ore, and, owing to decreased ore reserves, additional capital expenditure must be curtailed to its smallest possible dimensions. The question, therefore, to which I alluded last year of erecting a smelter, has vanished. The only policy really before us is that of spending all the money we can proportionately expend on the development of the property, with a view to increasing the ore reserves, and this we are now doing by every means in our power. Without going into the technical details by which these results have been obtained, I think I may say that the cost of alterations and additions to the mill and sorting plant, by which this change has been effected, has not exceeded £5,000.

THE INTER-GUARANTY SYNDICATE.

The reports, which are before you, are so full and exhaustive that there is little left for me to say, and this seems—to me, at any rate—a most desirable state of affairs. But there are one or two points on which I desire to give you further information. You will remember that when I addressed you last year I informed you of the arrangements which this company had made with the Inter-Guaranty Syndicate, with regard to the necessary guarantee which our bankers required for the large overdraft they had provisionally agreed to make. I also informed you that it was necessary that both Mr. Hoover and I should participate in that guarantee, and that we should be pleased to relinquish our positions in that syndicate to any shareholder who wished to take our place. It will interest you to know that no shareholder came forward, and the positions of Mr. Hoover and myself remained unchanged. I explained to you that the consideration which the Inter-Guaranty Syndicate was to receive was the right, during the month of April, 1915, to call upon the Messina Company to issue to its shareholders 170,000 of its reserve shares, at not less than 10s. per share, the syndicate agreeing to underwrite the issue, if made, for a commission of 5 per cent. In this case the syndicate was to have the call of the remaining 100,000 reserve shares until January 1, 1916, at 10s. per share. When the month of April arrived it was found that the Messina Company, owing to the Government restrictions on new issues, was unable to implement its part of the bargain as to issuing these shares, and, after some negotiation, a new arrangement was made whereby the options were cancelled, and the Messina Company agreed to pay the formation expenses of the Inter-Guaranty Syndicate, and a commission at the rate of 2 per cent. per annum for its guarantee on £50,000, and the Inter-Guaranty Syndicate agreed to continue the guarantee up to January 31st, 1916. About the middle of September in this year it became evident that the finances of this company were on a more assured basis and that the continuation of the guarantee was therefore unnecessary. On being approached, the Inter-Guaranty Syndicate at once agreed to cancel the obligation on both sides as from September 30 last. The result has been that this guarantee, which has extended over 15 months, has cost the Messina Co. about £1,500, and that the company now controls the whole of its unissued shares. (Hear, hear.) I hope, gentlemen, that you will regard this solution of a rather difficult situation as not unsatisfactory to the company.

EXCESS PROFITS TAX.

With regard to the excess profits tax, you will probably expect me to say a few words on its incidence as affecting this company, and I think I cannot do better than quote Mr. McKenna's words in the debate in the House of Commons on October the 27th last. He said: "The case has been brought forward of capital used in the development of businesses, and a rubber company was particularly mentioned. No subject has given more anxiety than the question of how to deal with companies that do not come into the immediate enjoyment of their capital expenditure. Colliery companies come under the same head. It takes years before the capital expenditure becomes remunerative. We thought that the right way to deal with it was to treat it as a question of the rate of interest on the capital. Take the case of a rubber company. If I were a referee I would look upon it as ridiculous to suggest that 6 per cent. was an appropriate rate of interest, seeing that these companies do not pay under five or six years. We must therefore give a higher rate; and that is a question which will come before a referee, who will have to decide what it shall be." A member then asked: "Will that rate of interest include some provision for wasting security" Mr. McKenna replied: "Of course it would. For instance, I had a case brought to me of a gold mine which from start to finsh had only five years' life. Given such a mine, which has only just begun to pay for the first time this year, a 6 per cent. return on the capital would be absurd. It would not even pay the interest. They have to repay the whole of the capital in five years. It is a case that ought to go to the referees. The referees are a business body well qualified to judge of these points, and they will take a fair view of what the allowance ought to be." It seems quite clear that this company comes under the same category as this gold mine. Shareholders have had no return on their investment during the nine years of this company's existence, so that it follows that shareholders have got to get back nine years' interest on their investment, and also their capital representing that investment, out of the mine, which is a wasting asset, before they can be said to earn any profit at all. It is evident that we shall have to go before the referee; but I am unable to say, otherwise than I have indicated to you, what view the referee will take of the circumstances in which we are situated.

DIVIDEND PROSPECTS.

There are some points about the future which we have to keep steadily in mind, such as the taxation question, to which I have alluded, the contingent liability under the railway guarantee to the South African Government; the redemption of debentures, which commences next year, and the current financial requirements of the company under present uncertain conditions. The question of dividend must be subservient to all these considerations. We are hopeful that in the early part of next year it will be possible to declare an interim dividend, should no unforeseen change in the position take place. (Applause.) In conclusion, I think you have working for you, both in South Africa and here, some very competent and capable technical men. The result of their work, which is before you to-day, is a greater compliment to them than anything I can say; but there is another point, which is not before you, and to which I ought to call your attention, and that is the great credit which is due, not only to Mr. Emery, but to the whole staff at Messina, for their work during the past year, and particularly at that period of the year, when an epidemic of sickness made the whole camp short-handed. I feel sure you will agree with me in expressing to them our thanks and appreciation. I would like to add to that (Mr. Hoover said), that I think those words express the views of the entire board, including myself. I have now to move: "That the directors' report, together with the balance sheet and accounts for the year ending June 30, 1915, be and are hereby received and adopted." I will ask Mr. Frecheville to second the motion, and afterwards I shall be glad to reply to any questions shareholders may desire to put.

Mr. R. J. Frecheville (Director): I beg to second the resolution.

In reply to a question as to the probable life of the mine, the Chairman said it was quite impossible to estimate it. It entirely depended upon an extension of the ore bodies in depth, of which there was every prospect, and the picking up of other ore bodies of a similar character in the unexplored territory. There was a considerable amount of territory yet to work over, and the prospects were not at all bad; but to give any actual estimate of life was quite impossible with that type of ore body.

The resolution was then put and carried unanimously.

FORMAL BUSINESS.

The Chairman next proposed the re-election of Mr. Frecheville as a director of the company.

Mr. John P. Grenfell (director) seconded the motion, and it was carried unanimously.

Mr. Nevill proposed the re-election of Messrs. Allen, Attfield and Co., as auditors of the company, for the ensuing year, at a fee of 30 guineas.

Mr. Moore seconded, and this resolution was also carried unanimously.

A shareholder proposed a vote of thanks to the directors for the very able manner in which they had conducted the affairs of the company during the past year, and for the splendid report that Mr. Hoover had brought before them.

This was seconded, and unanimously accorded; and, with the brief reply of the chairman, the proceedings terminated.

DAGGAFONTEIN GOLD MINING.

DEAL WITH THE C.M.S. APPROVED.

UNDERTAKING AS TO NEW SHARES AND OPTIONS.

The adjourned fourteenth ordinary general meeting of the Daggafontein Gold Mining Company, Ltd., was held on January 24th at River Plate House, Finsbury Circus, Mr. H. G. Latilla (Chairman of the company) presiding.

Mr. H. B. Browne, representing the secretaries (Henderson's Transvaal Estates, Ltd.) having read the notice convening the meeting and the auditor's report.

The Chairman said: Gentlemen,—I do not propose to detain you long with regard to the annual general meeting; our balance-sheet, I think, is self-explanatory. There is very little variation from the figures of last year; such as have been changed are mostly in respect of interest on loan. We have done no work. As you will remember, when we closed down we had struck the reef in our shaft at a depth of 3,580 ft., the value being 7.8 dwts. over a little more than 40 ins. I shall, of course, be very pleased to answer any questions, but I think the real purpose of our meeting to-day is the extraordinary general meeting which immediately follows this; so I shall formally move: "That the report and accounts as submitted to the meeting be and they are hereby approved." and I will ask Mr. Richards if he will kindly second that resolution.

Mr. Roger C. Richards seconded the resolution, and it was carried unanimously.

Formal resolutions were than passed electing Mr. Walter Lewis Castleden and Mr. W. E. Lawson Johnston as directors and Mr. James Henry Stephens as auditor.

TERMS OF THE ARRANGEMENT.

An extrordinary general meeting was then held to consider the proposal contained in a letter dated the 12th January, 1916, addressed by the Consolidated Mines Selection Company, Ltd., to this company.

The notice calling the meeting having been taken as read,

The Chairman said: Gentlemen,—The notice and the letter from the Consolidated Mines Selection Company have been in your hands now for some time, and I take it you are all more or less conversant with the terms of the proposed sale by us of our property to a new company. I believe there has been some little misconception arising perhaps out of the terms of the letter, but I hope to make everything clear in the few remarks I am about to offer to you. Briefly, the Daggafontein Company, as known to-day, will sell its property to a company which will be registered in South Africa. This company will receive what will be the equivalent in respect of each 100 shares 50 shares in the new company and the right to call at par for three years 25 further shares. I think that answers the question which has been raised by various shareholders in correspondence. There is a further point which I have to deal with and I do not think I can do better than adopt the words used by the gentlemen who writes the mining article in "The Financial Times." He wrote on the 19th of January, after dealing with the position on the market of Daggafonteins, to this effect:—

"Doubtless the Chairman at Monday's meeting will be willing to give a formal guarantee that the new Daggafontein shares and options, will be held in trust for shareholders, and will not be dealt with in any way without their approval. For each four existing shares the old Daggafontein company will receive two fully-paid shares in the new company and a three years' option on a third share at par. On this basis it will be obviously fairly easily to work out partly quotations between the old shares and the new."

While this Board, of course, has nothing to do with the market price of either the old or the new shares we, as a Board, are perfectly willing, and we now give to you an undertaking that we shall not deal in the shares of the new company, or in the options, until such time as we receive from you in general meeting a consent to our doing so. (Hear, hear.) I think that will perhaps clear up the position as regards the possible value of our shares. One of the terms which had to be arranged with Henderson's, to whom we were very largely indebted, was the extinction of the debt to that company. This has been fixed up on the basis of Henderson's Company receiving 129,780 shares in the new company, and they will also take over from us in further payment of the debt securities now held by us, and which are approximately valued to-day at £17,000. In consideration of their accepting that settlement, they undertake on their part to bear all the future cost of the administration of your company, so that in effect, once this scheme has received your approval, and the details have been carried out the existing Daggafontein Gold Mining Company's interest will be the shares and the options which I have already spoken about, and it will have no liabilities to meet. It does not matter how long the company is kept alive, Henderson's has got to pay the bill, so I think that is a fairly satisfactory solution of the difficulty.

CAPITALISATION OF NEW COMPANY.

The new company will, according to the letter from the Consolidated Mines Selection Company, be registered with a capital of £540,000. I have to suggest to the gentlemen in control of the Consolidated Mines Selection Company that it would probably be better if they immediately registered the company with a capital of, say, £700,000, the reason for that being that under the scheme 398,033 Vendors' shares have to be created and, within a given period, 300,000 shares have to be issued for cash at par. That is only a small matter, but I thought I had better deal with it now to prevent any misconception hereafter. The articles of the new company, as stated in the letter referred to, will give power to the directors of the new company to further increase the capital of the company to meet any options which may be exercised under the terms terms of the arrangement. The new company's assets will consist of the farm Daggafontein. I may just mention here that up to date we have spent in boring, and sinking what is probably as good a shaft as there is on the Rand, a sum of £312,000. The benefit of that, of course, will accrue to the new company. Under the laws in the Transvaal the company will have the right to 1,436 claims, that being arrived at as follows:—The company has already been awarded in respect of its discoverers' rights 179 claims; it will on proclamation of the farm be entitled to one-fifth of the actual claim area of the farm, which is estimated to be roughly 6,283 claims; our one-fifth being 1,257 claims. Deducting the 1,257 and the 179 from 6,283 will leave roughly 4,847 claims to be taken up by those who acquire from the Government the right to mine them. In respect of those claims—that is, the claims other than our own—there will be a 5s. claim licence per month to be paid, and, of that 5s., 2s. 6d. will belong to the company which owns the farm. That, I think, works out roughly, supposing the claims are pegged all over the surface, £7,272 per annum for claim licences which will accrue to the new Daggafontein Company. I have gone to the pains of setting that out, because a shareholder wrote asking to whom the 4,847 claims will belong, evidently being under the impression that they would be owned by the new Daggafontein Company. He also asked me to deal with the question as to whether these further claims had been proved. The answer is, I believe, that our shaft, other than the few boreholes which were sunk by us in recent years, represents the whole of the development work on the farm, and naturally the claims which the new Daggafontein Company will hold will be all in the neighbourhood of the shaft. As to what the further area of Daggafontein may contain, I am afraid I cannot hazard a guess.

FAR AND AWAY THE BEST OFFER.

Before sitting down, I should like to say that we have been put to some considerable trouble in connection with this deal, the result, so far as you are concerned, being much more satisfactory than at one time was probable. I will not deal with conflicting offers; I will only say that the offer which we are submitting to you today and strongly recommending you to accept is far and away the best we have received. (Applause.) And I should like to express my personal opinion that we are very much indebted to the Consolidated Mines Selection Company for coming forward in these rather extraordinary times and making themselves responsible for as large a sum as £300,000. The fact that the new work will be under the auspices of the Consolidated Mines Selection Company is, to my mind, a very great advantage. (Hear, hear.) That group has been highly successful with neighbouring properties, and I believe their management is the admiration of most people in Johannesburg, and of probably a good many people in England who are now reaping an advantage by reason of dividends and good prospects. I think, gentlemen, I have touched upon all the points, but naturally I shall be pleased to answer any questions. I beg formally to move: "That the directors be and they are hereby authorised to accept the proposal contained in the letter of the 12th January, 1916, written by the Consolidated Mines Selection Company, Ltd., to this company, and to enter into any agreements which the directors may consider necessary to carry the same into effect."

Mr. Richards: The whole of the points have been put before you so clearly by the Chairman that I certainly cannot add anything that would be useful. I might just make this one observation: This is a freehold farm, and therefore we are not incurring, and have not in the past incurred, any expense in the way of payments for licences. Personally, I can only express my satisfaction that the offer has been made at such a time. Your directors had become reconciled to the fact that we should have to wait for the close of the war before it was possible for us to proceed with any further development work. However, the offer which has now been made to us, and which we very strongly recommend you to accept, relieves us of that responsibility, as it means that we shall get to work probably some years earlier than we expected. I have very great pleasure in seconding the resolution.

QUESTION OF OPTIONS.

Mr. Aubrey Hyman: There is just one little thing which I wish you to make clear. You say in your circular that "this company will also have the option to subscribe for a further 134,126 shares of the new company at par." That is rather ambiguous; I do not quite understand it, and the shareholders do not understand it. Holding Daggafontein shares as I do today, do I get that option, or does the new Daggafontein Company get that option?

The Chairman: I thought I had made that quite clear. I said that so far as this company's board is concerned it would give to the shareholders of this company an undertaking that it would not deal with either the shares or the options coming to it in respect of the sale. I thought that it would probably be clear to most of you that there was some reason for my giving that explanation. You obviously have in your mind that this company should either distribute the options or the shares by way of a dividend. That is a course which we cannot even consider for the moment. I am not in a position to go into the details with you, but I think I could satisfy you in two minutes after the meeting is over.

Mr. Hyman: I daresay you have very good reasons.

The Chairman: You may take it that I have.

Mr. Hyman: I think I must congratulate the board on doing an extraordinarily good "deal," especially in these times. I really thought myself—I have just returned from Johannesburg—that it would be a few years before the Daggafontein would be able to come to the front. It is quite a good property, but during these times I thought it was impossible, and I think every credit is due to a firm like the Consolidated Mines Selection for putting up such an enormous amount of money. The terms, in my opinion, are very liberal, and it shows us that a little competition at times is very good. They are certainly very much better terms than those originally offered; in fact, you cannot compare the two sets of terms. I do not think you have made quite enough of the fact that it is not only £300,000 which is being provided, but that the Consolidatded Mines Selection Company are practically guaranteeing three-quarters of a million, which in these times in a most marvellous thing. I certainly think that a hearty vote of thanks ought to be passed to the directors for bringing the negotiations to such a favourable issue. (Applause.)

The Chairman: Praise from Mr. Aubrey Hyman is very welcome. (Laughter.) He has the reputation of not always being so pleased. I am sure the Consolidated Mines Selection Company will not share his view as to the guarantee of £750,000, but if we could have got the guarantee we should have been very pleased. As it is, I am quite certain that if the result of the development work is as good as it is at the Springs Mines, the amount which we estimate will be required to bring this property to the producing stage will be forthcoming.

The resolution was then put to the meeting and carried unanimously.

Mr. R. de la Bere proposed a hearty vote of thanks to the Chairman and directors.

Mr. Hyman seconded the motion, which was unanimously adopted.

The Chairman briefly acknowledged the compliment, and the proceedings terminated.

PHOENIX GOLD MINES.

The annual meeting of shareholders of the Phoenix Gold Mines, Ltd., was held in the offices of the secretary, Mr. S. B. Dowling, at Bettelheim Buildings, on February 11th, Mr. Harry Graumann, M.L.A., presided, and the others present were Mr. J. H. Ryan, W. T. Birch, W. Just, G. P. Pascoe, W. Nelson, D. O'Regan, and S. Alexander. The total shareholding representation, in person or by proxy, was 230,108.

Submitting the annual report, the Chairman said:—The property of the company is unchanged, and consists of a freehold portion of the farm Witpoortje No. 12, district Boksburg, of which 100 morgen is held under mijnpacht brief; also the freehold farm Rietffontein No. 1779, Waterburg district, in extent 1,282 morgen. The agricultural rights of your East Rand property are leased for a limited period, your company receiving one quarter share of all crops raised. The tenant acts as caretaker, keeping all beacons in order and attends to the necessary repairs to buildings, etc. The farm Rietfontein is occupied at present by native sqatters, from whom a rental is obtained for grazing and agricultural privileges granted to them. It is the intention of your board to lease the whole of the agricultural rights of this farm when a suitable tenant is found. No mining operations have beeen conducted on any portions of your property for some considerable time, and you will recall the policy of your board, stated at previous meetings, when it was anticipated that within a reasonable period sufficient and encouraging data might be available to justify the favourable consideration of initiating active operations, but the required infomation has not been forthcoming, and your directors adhere to their original policy of husbanding the financial resources of your company, and are awaiting suitable opportunities for good business. The board is carefully and keenly watching the great developments on the Eastern Rand, and more than ever are anxious to ascertain, as work proceeds there, whether later on the same may have any important bearing on your company's claim holdings. The accounts before you reveal that your cash assets amount to £27,877. The revenue for the period under review, which includes increased interest on loans for the months August to December, 1914, amounted to £1,509, being £889 in excess of expenditure. Mr. Ryan, who presided at the annual meeting in 1915, very fully dwelt on the difficulties experienced by your board in deciding on a suitable investment for your cash reserves, and pointed out that your board considered that during the period of grave unrest that prevailed it was not justified in venturing upon risky speculations. These serious conditions, with almost accentuated gravity, still prevail, and although your board is at all times anxious to give full consideration, and to follow out if possible, the recommendations of shareholders, it has not been deemed advisable to venture into risky speculations. Consequently your board has adhered to its policy of keeping your cash reserves intact, and will continue this policy until a favourable opportunity for good investment presents itself.

The report was adopted. Messrs. J. H. Ryan and J. Andrew Cohen were re-elected to the board, and the auditors, Messrs. F. W. Diamond and English, were reappointed.

THE AFRICAN LIFE.

A RECORD OF PROGRESS.

NEW ACTIVITIES.

EXCELLENT PROSPECTS.

The eleventh annual general meeting of members and shareholders of the African Life Assurance Society, Ltd., was held in the board-room of the society, Hatfield House, to-day, when there were present, among others, Messrs. R. Baumann (in the chair), I. W. Schlesinger (managing director), W. O. Bullock, J. A. MacRae (manager), Sir Kendal Franks, I. F. Atterbury, Francis Napier, D. M. Burton, A. Susman, D. H. Barnett, M. Abrahams and the secretary (Mr. A. Fuller-Jones).

The Chairman, in moving the adoption of the directors' report and balance sheet, said:—Gentlemen,—The directors' report, revenue accounts and balance sheet are before you, and I shall as usual draw your attention to some of the more important points referred to therein. In the first place, you will observe from the directors' report that the number of applications received during the year in the ordinary department was 5,389 to assure £1,649,675; of these 1,488 for the sum of £316,950 were declined, postponed or not proceeded with, leaving 3,901 applications completed and policies issued, totalling £1,332,725. At the last meeting I pointed out that we could easily have increased our figures for that year by accepting war risks, and the same remarks apply in this instance, had we pushed the business, but the policy of the directors has been throughout one of extreme caution, and the lines upon which our business is being developed are calculated to yield the greatest benefit to our policyholders. Income: Turning to the revenue account, you will observe that the premiums and interest amount to £193,154 7s., which total I feel sure you will consider very satisfactory indeed. On the expenditure side of the revenue account you will note that during the past year we paid out £27,281 7s. 6d. to the representatives of the deceased policyholders. You will also observe an item "endowments matured plus bonuses £3.453." I draw your attention to this item as this is the first occasion on which such an item appears in our accounts. The next point in the accounts to which I have to refer is the industrial department revenue account, which now appears for the first time. Nine months ago this department was inaugurated, and as the revenue account shows we have made a really excellent beginning, and we start the year 1916 with a premium income of £65,690—undoubtedly a world's record. Funds: Referring to the balance sheet, you will observe that the life assurance funds have increased during the year from £357,949 19s. 11d. to £434.875 4s. 4d. the net increase being £76.925. This I think you will agree is satisfactory when you consider that we paid an income tax of £1.278 16s. 11d and have set aside £2.000 as reserve for depreciation of Government and municipal stock. Had we not set up a reserve for depreciation of Government stocks, or, in other words, had we taken them into our accounts at market prices as at June, 1914, as insurance companies, and banks and other financial institutions in England and America have done, and if there had been no payments made under matured endowments our funds would have shown an increase of £82,378—a figure exceeding anything previously accomplished. I mention this merely in order to enable you to rightly judge of our relative progress this year and last year. In conclusion, I hardly think it necessary to enlarge very much upon the figures in the accounts, as they speak so eloquently for themselves. All I need say is the results of the year's work are most satisfactory, and are an eloquent testimony of the ability with which the affairs of the society have been directed by the management, the able staff, and the agents throughout the country. I now formally move the adoption of the directors report and balance sheet.

Features of the Report.

Mr. I. W. Schlesinger, in seconding the adoption of the directors' report and balance sheet, said:—Gentlemen, I have listened with interest to the remarks of our chairman, and I have much pleasure in seconding the adoption of the balance sheet, but before voting upon it I will presume upon your valuable time for a few minutes, to impress upon you what seems to me to be its outstanding features. On January 5, 11 years ago, the African Life issued its first policy, and I am glad to say that throughout the intervening years this society has given faithful, equitable, and efficient service to its members. The growth of the African Life alone proves what I say. Our assets have increased 16-fold, and this notwithstanding the society having paid to policyholders and to beneficiaries over a quarter of a million sterling. But neither age nor size is of so much importance to members as what the society is now doing for them. Considered from that point of view, it would be hard indeed for anyone to find fault with any item in the statement for the year just closed. A significant item both as to cost of insurance and the character of our investments is to be found in the fact that the interest on our investments earned during the year was almost sufficient to pay the total of our current death claims. In this connection I may also state that the actuarial valuation disclosed a surplus of over £30,000 for distribution among policyholders in addition to the £34,000 previously allocated. Dealing with the item "matured endowments" referred to in the revenue account, these are 10 year endowment policies which have just fallen in, and you will be pleased to know that the bonuses paid on these are at the rate of £2 2s. per cent. per annum—this is equal to anything ever paid by any other life office in this country.

Industrial Department.

The Chairman, when dealing with the policies issued and total assurance effected for the year under review referred only to the ordinay life department. You will observe, however, that on April 1, 1915, we inaugurated a so-called industrial department; in other words, a department solely devoted to the issuing of policies to the industrial population for amounts not exceeding £100 on any one life, and on which the premiums are collected weekly. The total number of policies issued for the year 1915 in both departments therefore amounted to 74.311, assuring £3,004,078, a sum almost a million in excess of anything previously accomplished for one year in South Africa by any other life assurance company. The annual premium income from the assurances completed in the industrial department for the period of nine months amounts to £65,690 19s., and incidentally I might state that this is a world's record. We have accomplished in nine months that which has taken leading British companies 10 years to do. Even in America, where they are accustomed to do things "big," our figures for a similar period for so young a company as ours have not been surpassed—a clear indication that we are supplying a long-felt want. Since the establishment of our industrial department we have effected over 70.000 policies on the lives of men, women, and children who represent the working classes of the population of this country. Industrial policyholders, moreover, represent all sections of the population, and in many instances have but little opportunity to come in contact with modern educational movements for the preservation of health and the conservation of life. I feel that in dealing with these members of the industrial classes this society has an obligation beyond that contained in the policy contract.

"Welfare Campaign."

During my recent visit to America I was very much impressed with the results achieved there by the large industrial companies in life conversation, and with this thought in mind I decided upon my return that the African Life should attempt something similar, and the result that we have now entered upon a "welfare campaign." In other words we have voluntarily undertaken to recognise the necessity of caring for those of our members who become afflicted with bodily disease. As an illustration of what could be done I would mention that in Johannesburg alone there were 4.080 deaths during the year 1915, and out of that number quite 50 per cent. were due to organic disease of the kidneys and urinary system, and of the heart and circulatory systems. I feel I am safe in saying that 75 per cent. of such deaths could be postponed indefinitely if we could teach these people personal hygiene—how to guard against these afflictions, and to encourage periodic health examinations. You are no doubt aware that the practice of industrial companies is to issue policies upon approved lives, irrespective of age, and in consequence a large proportion of this class of insurance is effected upon the lives of children, for limited amounts. The high mortality among infants, from preventible diseases (as the statistics of any town in this country will show), clearly indicates that our first endeavour must be, through suitable literature, to make it possible for the average mother to know which conditions are serious and require proper medical treatment without delay, and in this connection I am glad to say that we have already met with gratifying results. I, of course, fully realise that literature in itself is insufficient for the complete development of our campaign of education and prevention of disease, and therefore our next consideration will be the appointment of nurses to act under the supervision of a physician, to visit and attend sick policyholders too poor to engage a physician. Visiting nurses has demonstrated its value wherever it has been tried. The actual care and treatment given by the nurse are probably the least of her actitivies. Her work consists of spreading broadcast the principles of personal and domestic hygiene. The services of the nursing staff will be particularly devoted to acute diseases and conditions where there is a strong possibility of recovery. Under this head may be included pneumonia, influenza, bronchitis, and the various children's ailments. Maternity service will be given after the mother has been insured one year.

Campaign Against Tuberculosis.

An energetic effort will be made by the society to educate policyholders with regard to this disease, and provided the industrial department meets with the same degree of success during the next few years as it has done during this, it is our intention to erect sanatoria in suitable localities for the benefit of those policyholders who cannot afford the charges of a private sanatorium. These, gentlemen, are only a few of the benefits which the industrial department will offer its policyholders, but I think they are sufficient to indicate the lines on which the department is run and the valuable service we hope to be able to render the community. It has been justly said that insurance in its varied applications to every detail of our complex life is the greatest benefit of civilisation, and the African Life, in endeavouring to apply its benefits to the family in every possible way, and by doing this in thousands of cases, is silently—but all the same surely—helping to advance the general welfare of the community. In conclusion, gentlemen, I congratulate you on the wonderful strides the society has made. No sort of ill-starred time seems to have the least effect on the triumphal upward march of the African Life, and as to what we may expect in this country after the war is over—well, opinions on the subject vary considerably. The enormous destruction of property can only mean that interest rates will be very much higher for many years to come. Europe instead of supplying other countries with funds as heretofore will, for a considerable period, require all the money and more for the purpose of permanently financing the enormous indebtedness which is being piled up for the purpose of repairing the damage done by war, and to pay the indemnities which the Central Powers will certainly have to pay. Permanently I am of opinion that very little European money will be available in South Africa, and it will be, so to speak, "up to us" to help ourselves. Here then you have one of the many reasons for the necessity of the practice of exceptional economy. We in South Africa must acquire the thrift habit to a greater degree, and if we do we shall have sufficient money—for a time at least—to carry forward our legitimate developments. Our slogan must be "Economy and keep the money in the country."

Savings Bank.

It is here where the value of the savings bank and life assurance companies appears. Every penny deposited in the bank or invested in South African life insurance companies goes to augment the fluid capital which is a necessity for the establishing of industry. Indirectly in the form of industrial and commercial loans it goes into buildings, machinery, farming implements and the raw material and labour which produce the goods the community needs. The aggregate of this accumulation, small and large, constitutes the capital without which efforts are rendered feeble. This idea should be instilled into the people of South Africa, and brought into general adoption, and unnecessary outlay in domestic life be kept at a minimum. Of course, the same applies not only to domestic life, but to every class of business, and to the various branches of our Government too. I have no fear as to what will happen in the country after the war is over. Whatever we may think what will take place when the readjustment comes, I am sure that whether we have a world-wide depression or not, whether interest rates are high or low, conditions in South Africa will be more favourable than in many other countries, and we should thank God for having spared us from many of the miseries of this world war. I have much pleasure in seconding the adoption of the directors' report and balance sheet.

The report and balance sheet were unanimously adopted.

Messrs. Aiken and Carter did not offer themselves for re-election, and their remuneration for the past audit was fixed at £600.

Messrs. Deloitte, Plender, Griffiths, Annan and Co. were elected auditors for the ensuing year.

The retiring directors were re-elected, except Mr. Emrys Evans, who did not offer himself for re-election.

A proposal to vote the directors £300 each as remuneration for their services was agreed to.

On the motion of Sir Kendal Franks, a vote of thanks was accorded to the chairman.

THE WEEK IN THE SHAREMARKET.

Improving—London Advices Better—Outlook Satisfactory.

MORE business and a more optimistic feeling were the features of the market this week. Fears of new taxation in the Imperial and Union Budgets have frightened some investors out of their holdings, but this factor has been offset by the good steady returns from the mines, the improved ore reserves at so many of the big properties, and the satisfactory position of the native labour supply. The outlook for the current year, apart from the probability of increased cost of imported supplies, is excellent; and the industry has the added satisfaction of knowing that its smooth working is the chief factor in maintaining London as the only open gold market in the world. The week's fluctuations, as will be seen below, are not many.

Writing of Brakpans, in mail week, the *Financial News* says:—These shares changed hands up to £4 and closed a further 1-16 to the good on balance at 3 31-32 rather buyers. An official cable is isued this evening giving the result of the recalculation of the Brakpan's ore reserves as at end of 1915, and, as we have foreshadowed, they show a big jump on the year, both in quantity and value. The total of 3,017,000 tons is over half a million tons greater than a twelvemonth ago, while the unusually rich grade of the new stuff opened up is evidenced by the fact that it has raised the average value of the whole tonnage by well over a dwt. to 7.86 dwts. (say, 33s. 5d.) per ton. On these figures the "profit in sight" works out at anything from £2 10s. to £3 per Brakpan share—an enviably strong position for a mine with some twenty years' life still ahead of it.

	Friday. 18th.	.Sat. 19th.	Mon. 21st.	Tues. 22nd.	Wed. 23rd.	Thurs 24th.
African Farms	9 0	8 9	8 6*	8 0*	8 0*	8 0
Apex Mines	5 6*	5 6*	5 6*	5 6*	5 9	5 9*
Aurora Wests	10 0*	—	9 9*	9 9*	9 6*	9 6*
Bantjes Cons.	12 9	11 9	12 9	11 9	12 6*	12 9
Brakpan Mines	—	71 6†	72 0†	68 0*	—	71 0*
Breyten Collieries.	—	19 0*	19 0*	—	—	19 0*
Bushveld Tins	0 9*	0 9	0 6*	0 6*	0 7	0 8
Cassel Coals	—	19 6†	—	—	19 6†	—
Cinderella Cons.	—	—	6 0*	5 3*	5 3*	5 6*
City and Suburbans.	34 0*	34 0*	34 0*	34 0*	34 0*	33 6*
City Deeps	—	70 6*	70 6*	71 0	72 0	70 6*
Cloverfield Mines	8 0	7 8	7 6	7 3	7 6	7 9*
Clydesdale Collieries	14 0*	—	13 6*	13 6*	13 9*	13 6*
Con. Langlaagtes	33 0†	—	32 0†	—	31 0*	32 0*
Con. Main Reefs	19 0†	18 6*	18 6*	18 0*	19 0†	18 6
Con. Mines Selection	14 0*	14 6†	14 0*	14 0*	14 0*	14 0*
Coronation Collieries	26 0*	26 0*	26 0*	26 3*	27 0*	28
Coronation Freeholds	—	0 3*	0 3*	—	—	0 3*
Coronation Syndicates	—	2 3*	—	2 3*	2 3*	2 3*
Crown Diamonds.	2 0*	2 0*	2 0	2 3	2 6	2 3*
Crown Mines Deb.	—	—	£100†	—	£95*	£95*
East Rand Centrals.	5 1	5 0	5 0	4 10	4 10*	4 9
East Rand Coals	2 9*	2 8*	2 9	2 9*	2 9	2 10
East Rand Deeps.	1 6*	1 6	1 6	1 4	—	1 5*
East Rand Minings.	—	12 6†	11 9	11 6†	10 0*	10 0*
East Rand Prop.	18 0	16 0*	16 6*	17 0*	17 6*	17 0*
East Rand Deb	—	—	£77½*	—	£77½*	£77½*

	18th. Friday.	19th. Sat.	21st. Mon.	22nd. Tues.	23rd. Wed.	24th. Thurs.
Eastern Golds	1 3*	—	1 3*	1 3*	1 3*	1 2*
Ferreira Deeps	—	—	38 9†	—	—	38 9†
Frank Smith Dimds.	2 6*	—	2 4*	2 1*	2 6	2 3*
Geduld Prop.	36 3	35 3	35 6	35 6	35 6*	35 9
Glencairns	2 6	2 0*	—	—	2 0*	—
Glencoe Collieries	—	6 9†	5 9†	—	—	—
Glynn's Lydenburgs.	—	8 9*	9 6*	9 0*	9 6*	10 0*
Govt. Areas	31 3	30 6	30 6	30 0	30 6	30 3
Jupiters	7 0*	7 6†	6 9*	6 6*	7 0*	6 9*
Klerksdorp Prop.	1 9*	—	1 6*	—	—	—
Knight Centrals	16 6	15 4	15 6	15 5	17 7	16 1
Knights Deeps	—	—	22 6†	—	22 6†	—
Lace Prop.	4 6*	4 9*	4 9*	5 0†	4 6*	5 0†
Luipaardsvlei Est.	—	8 0†	—	—	7 0*	—
Lydenburg Farms.	8 3*	8 2*	8 0	7 10	8 3*	8 4*
Main Reef Wests	8 6*	8 9	8 9	8 6	8 6*	8 10
Meyer & Charltons	100 0*	—	—	—	—	100 0*
Middelvlei Est..	1 4*	—	1 3*	1 3*	1 3*	1 3*
Modder B.'s	115 0*	114 6*	115 0	—	—	—
Modder Deeps	113 6*	113 6*	114 0	112 6*	113 0*	113 0*
Natal Navigations	17 0†	—	17 0†	17 0†	17 0†	17 0†
New Boksburgs	2 0†	1 6*	1 6*	1 6*	1 4*	1 5*
New Eland Diamonds	12 6†	—	12 6†	12 6†	12 6†	12 6†
New Era Cons.	7 8*	7 6*	7 7	7 6*	7 6*	7 6
New Geduld Deeps	3 9*	3 9*	3 10*	3 10*	3 9*	3 10
New Kleinfonteins.	28 9*	28 3	28 6*	28 6	28 9	28 6
New Modders	302 6*	302 6*	305 0B	305 0A	—	301 3*
New Unifieds	—	13 0†	13 0†	13 0†	11 6*	11 9*
Nigels	7 0*	7 0*	—	7 0*	—	7 0*
Nourse Mines	—	15 0*	15 0*	15 0*	—	—
Pretoria Cements	60 0*	62 0	60 0*	60 0*	62 6	62 6*
Princess Estates	3 8*	3 7*	4 0†	3 0A	3 9	—
Rand Collieries	3 6*	—	3 0*	3 0*	3 0*	3 0*
Rand Klips	6 2*	6 1*	6 0*	6 0	6 2*	6 0
Rand Nucleus	1 9*	1 9*	1 11	2 0†	1 9*	1 8*
Randfontein Deeps	3 6*	3 6*	3 9	3 6*	3 7	3 6*
Randfontein Estates.	11 0*	11 0*	12 0†	12 0†	10 9*	—
Roberts Victors	—	9 6†	8 6*	9 0*	9 0*	9 0*
Rooibergs.	12 3*	12 3*	12 3*	12 3*	12 0*	11 6*
Roodepoort Uniteds	8 3†	8 3†	7 9†	—	8 0†	—
Ryan Nigels	2 3*	3 6†	2 3*	2 6†	2 0*	2 3*
Shebas	2 0*	—	2 0*	1 9*	1 9	1 9*
Simmer Deeps	2 0*	2 0*	2 0*	2 6†	2 3*	2 3*
S.A. Lands	3 10*	3 9*	3 10	3 8*	3 8*	3 9*
Springs Mines	42 0*	41 6	42 0A	41 6	42 6	42 6
Sub-Nigels	12 0	11 6*	11 6*	12 0†	12 0†	11 6
Trans. Coal Trusts	53 9	53 6*	53 0*	54 0A	53 6*	53 0*
Trans G.M. Estates	—	—	—	24 0	24 0	—
Tudors	—	2 0†	2 0†	—	2 0†	—
Van Dyks	3 6†	3 †6	—	3 3†	3 3†	3 3†
Van Ryn Deeps	59 0A	58 0	58 0A	57 9	58 0*	58 3
Village Deeps	—	—	—	32 6*	32 6*	32 6*
Village Main Reefs	20 0†	20 6†	20 6†	20 6†	20 6†	—
Vogel Con. Deeps	1 11*	1 10*	1 10*	1 9*	1 10	—
Welgedachts	20 0†	20 0†	20 0†	—	20 0†	—
Western Rand Est.	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Witbank Collieries.	42 6*	—	42 6*	43 0*	43 0*	43 0*
Wit. Deeps	23 0*	22 6*	22 6*	22 9*	23 6	23 3*
Wolhuters	10 3	10 3*	10 3*	10 3*	10 3*	10 3*
Zaaiplaats Tins	11 0*	11 0	11 0*	11 0*	10 3	10 6

* Buyers. † Sellers. A Odd lots.

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METAL RESIDUES *and* SCRAP.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Speculation in Oils and Base Metals—A "Pinch" in Some Classes of Steel—Timber 10d. per Foot and Over—White Lead Recognised Quote 70s.—Petrol up 1s. 6d. Case —Electrical Goods Scarce in Parts.

There is a very cheerful feeling on the Commercial Exchange, as the orders are coming in from the mine buyers much the same, nevertheless there are intervals when a timid feeling prevails in reference to whether goods will come forward quickly enough to maintain these normal war conditions of a fair turnover monthly. There is an undercurrent of ideas that the British Government may require more ships as the Home spring advances, in fact some people go so far as to say that communications have passed between Pretoria and London on the subject. One of the shipping houses was interviewed, and it was gathered that a number of wiseacres profess to know a lot on the subject, but when the pruning knife is applied to their statements they disappear in a mist which cannot be applied to everyday business. The shipping representative remarked that no one can tell what will happen during the next forty-eight hours. He knew that the Dutch and Japanese liners coming via the Cape did not bring cargo for South Africa, but it may occur that their services might be made available for mining material in case it was urgently required. It is generally recognised that there is no shortage of ordinary mining material in Britain, the only difficulty is the freight question. Even to-day a speciality merchant was just a little boastful that he had partially overcome the difficulty by giving his forwarding agent a free hand as regards expense. Never mind the trouble, and spare no expense, are his instructions, but get the consignments away; and as the article referred to will carry some extra charges, the plan so far has worked admirably. The speculative element is entering more largely into the Commercial Exchange, and merchants offices, as a "small" man has done well in scouring the coast towns, by telegraph, for linseed oil, which enabled him to make a net profit of 5s. on every five-gallon drum secured. Another illustration is that the second-hand dealers and others are collecting scrap metal, particularly zinc and copper, for transhipment to Britain. This kind of thing gives just that zest to business to enliven men's wits to secure just those things wanted, and so far the risks have not been great, because since the war started all merchandise has been quietly on the up-grade, so that there is no such thing as being "stuck" with dead stock, because a little patience and finessing have hitherto resulted in good profits.

Iron, Steel and Hardware.

Our local iron works are making 20 lb. mine tram rails in plenty, but so far they cannot tackle railway metal, hence a nice large order has been placed by the Government with America. The rolling plant is not large and heavy enough to roll railway rails, and it remains to be seen whether scrap iron rails will stand the strain required in a railway track or even an electric tram line. What wonderful possibilities there is for the South African iron industries, and no one need be discouraged because we cannot do everything at first, as remember it took Australia about a century to make their first ingot of pig iron. In Johannesburg the pinch is beginning to be felt over the shortage of certain kinds of steel; for example, 3 in. steel turned shaftings are exceedingly scarce and practically at the moment unobtainable. Although adequate supplies are coming—in fact, a consignment is supposed to be on the water—yet there is no certainty when it will be here. There is a great scarcity of wrought iron pipes from one inch to four inches, and the mines are securing what they reasonably can, as the regulations about spraying underground are being enforced strictly, which means an immense quantity of piping in use for each producing mine. Not only are the mines purchasing piping freely, but their old stores and scrap heaps are being carefully sorted, and wherever possible new threads are made to conserve piping and so provide against contingencies. The expected general advance in prices has not yet taken place on steel and iron goods but there is a hazy idea that it may come about at any moment.

Timber and Building Materials.

The minimum price for standard deals is 10½d. per foot; however, some of the second quality with an undue quantity of knots and blemishes can be had cheaper. Also it may be that tenpence per foot would be the price for extra large quantities of the best, but the new level of tenpence seems firmly established with the tendency still to creep forward. The freight from the Baltic before the war was from 50s. to 60s. per standard, and it is now £15 to £20. Sailing vessels are shy in coming all the way to South Africa from Norway, when they can get a charter for the Mediterranean and earn more in comparison for the shorter voyages. Notwithstanding the price of timber and oversea materials, there are a fair number of private houses in Johannesburg and the suburbs in the course of erection and many in the finishing stages, hence the demand for timber and materials keeps up marvellously well. Again, at Benoni and along to the Springs district there is a lot of cottage property going up; not a few by speculative builders, who draw all their supplies from Johannesburg firms. However, on the whole the mines continue to be the best customers for the timber merchants. It is satisfactory to record that the Denver workshops for door and window frame manufacturing are still well engaged, and so far can see work well ahead of their present substantial orders. A short while ago it was rather easy to supplement the new deals, floorings, etc., from the second-hand yards, but now they are asking 7d. per foot for the deals, and the selections are not what they were. The fact is that second-hand material is not coming in so freely,

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WRIGHT'S ROPES.

neither is it going out too freely, as the farmers and others are more inclined to talk about the duration of the war rather than enter into any serious business.

Oils, Petrol, White Lead, etc.

Another rise in white lead of 5s. per 100 lbs. has to be recorded, which is checking the issue of new contracts for painting, and it also encourages the use of inferior material. In consequence of white lead, linseed oil, turps., etc., being in such a jumpy state as regards values, a lot of speculation has resulted, therefore our standard price list must only be taken as a guide. Motor spirits have advanced 1s. 6d. per case, partly on account of the increased cost of tins and packages in New York, and partly on account of the higher freights, when available. Glycerine is 2s. 6d. lb. as compared with 1s. before the war and 1s. 8d. three months ago. It is said that speculators are in the market to secure job lines in salad oil at about 60s. per case, as it is anticipated there is a pound rise in a case within a month or so.

Revised Price List.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, bar 20s., 22s. 6d. and 25s. (local do., 15s. up), angle 21s. to 21s. 6d. per 100 lbs.; mild steel bar, 3d. lb.; drill, 5¼d. lb., tool, 7½d. to 9d. lb.; steel plates, 10ft. x 4ft. x 1-16in., 24s. 6d.; do., ⅛ in. and 3-16 in., 23s. 6d.; ¼ in. and upwards, 22s. 6d.; 10 ft. x 5 ft. x 1-16 in., 26s.; ⅛ in. and 3-16 in., 25s.; ¼ in., 24s.; 10 ft. x 6 ft. x 1-16 in., 27s. 6d.; 3-16 and ⅛ in., 26s.; and ¼ in. up, 24s. 6d.; hexagon bolts, ⅜ in. to 3 in., 8d. per lb.; over 3 in., 7d. lb.; ½ in. up to 2½ in., 45s.; 2¼ in. to 6 in., 42s. 6d.; 6½ in. and over, 40s.; ⅝ in. up to 2½ in., 37s. 6d.; 2¾ in. to 6 in., 35s.; 6½ in. and up, 32s. 6d.; ¾ in., ⅞ in., and 1 in. up to 2½ in., 32s. 6d.; 2¾ in. to 6 in., 30s.: 6½ in. and up, 29s. per 100 lbs. Nuts, ⅜ in., 9d. lb.; ½ in., 50s.; ⅝ in. to 1½ in., 47s. 6d.; 1⅝ in. to 1¾ in., 52s. 6d. per 100 lbs.; 2 in., 7½d. per lb.; washers, ¾ in. and under, 30s., and above that size, 30s. per 100 lbs.; shoes and dies, 30s. to 32s. 6d. per 100 lbs.; rails, £15½ per ton; picks, 4 lbs., 22s. 6d. per doz.; shovels, 32s. 6d. to 42s. 6d. per doz.; hammers, drill, 6d. to 9d. lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 5s. 6d., 30 in., 7s. 6d., 36 in., 10s. 6d. per doz.; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 9¼d., 11ft., 9⅝d., 12ft., 9¾d.; 26 gauge, 6ft. to 10 ft., all lengths about 7d. to 7½d.; flat galvanised, 18 to 24 gauge, 31s.; 26 gauge, 32s. 6d. 100 lbs.; floor brads, 27s. 6d.; ceiling, 27s. 6d.: wire nails, 25s. 6d. to 30s. per 100 lbs.; solder, 50 per cent., 1s. 2d. per lb.; locks, rim, 45s.; mortice, 60s. doz.; barbed wire, 20s. to 22s. 6d. 100 lbs. coil.

Timber: Deals, Baltic, 9x3, up to 16ft. 10½d.; over, 10¾d. to 11½d. (Oregon, 10⅛d.); flooring, 4½x⅞ and 6x⅞, 5d. to 5½d. per sq. ft.; do., 4 x 1⅛, 6¼d., and 6 x 1⅛, 6½d.; Oregon edge grain, 5¼d. and 6¼d.; ceilings, 6 x ½, 3d. per sq. ft.; Oregon, 4 x ½, 4¼d.; pitch pine, 5s. 10d. to 6s. 1d. per cub. ft.: Oregon, 4s. 6d. per cub. ft.: clear pine, ½ in. x 12 in., 7¼d. per ft.; 1 in. x 12 in., 8d.; teak, small planks, 14s. 9d. per cub. ft.; do., large, 15s. 9d.; jarrah, 8s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 8d.; scantling, 9 x 3, 10d. per ft.

Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland, 9s. 3d. per bag; 8s. 3d., truck loads; lime, white, 7s. 6d., truck loads 6s. 6d., slacked; do., 5s.: blue, 3s.; bricks at kiln, stock, 35s.; wire cuts, 40s. to 50s. pressed, 65s. per 1,000, road transport now normal: salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6ft. plain, 21s. 6d.; fluted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 27s. 6d., boiled, 27s. 6d. per 5-gall.; white lead, 65s. to 70s. per 100 lbs.; turpentine, 52s. 6d. 2 4 galls.; coal tar, imported, 10s. to 11s. per 5 galls.; oxide in oil, 27s. 6d. to 32s. 6d. per 100 lbs.; dry oxide, 21s. to 22s. 6d.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 4s. per 12½ lb. bladders, 25s. casks of 100 lbs.; grease A.F. axle, 23s. 6d. to 25s. per 100 lbs.; tallow, 9d. per lb.; White Rose paraffin, 13s. 6d. 2 5; petrol, 24s. 6d. 2/4; motor oil, 6s. to 7s. 6d. per gallon; lubricating oils, 24s. per case; cylinder, 30s.: paints in tins, 8d. to 9d. per lb., according to quantity, and if ordered to be mixed, 10 per cent. on pre-war rates.

Chemicals: Mercury, £17 10s. per 75 lb. bottle; bichromate potash, 1s. 6d. lb.; chlorate, 2s. 6d. lb.; permanganate, 7s. 6d. lb.; alum, 9d. lb.; carbolic acid, 5s. 6d. lb.; borax, 66s. 100 lbs.; cyanide soda, 1s. 4d. lb.; hypo, 1s. lb.; acetate lead, 67s. 6d. 100 lbs.; litharge (assay), 57s. 6d., (commercial) 37s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 3d. lb.; plumbago crucibles, 4½ per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 14s. to 21s. wholesale, and 21s. to 27s. doz. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 9d. to 1s. per yard; 3/20 coils of wire, 27s.; do., 3/22, 23s.; tubing, 12s. to 13s. 100 ft.; keyholders, 2s. 6d. each; round blocks, 3½ in., 4s. doz., local; lamp holder cord grips, 15s. doz.: switches, 5 amp., 12s. to 13s. doz.: British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 15s. to 16s. 6d. 100: cleats, 18s. per 100; P.O. insulators, 18s.: motors, 3 h.p., about £30 new.

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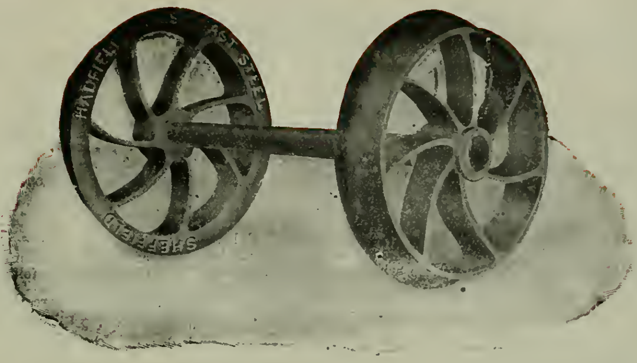

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THE MESSINA (TRANSVAAL) DEVELOPMENT COMPANY,

LIMITED.

DIRECTORS' REPORT.

The Directors submit herewith their Tenth Annual Report and Statement of Accounts for the year ended June 30th, 1915.

PROPERTY.

The property consists of the Freehold and Leasehold Farms representing a total of 22,432 acres, standing in the Company's books at a cost of £141,671. A block of coal claims on the Farm Rotterdam, and a block of lime claims in the same neighbourhood, are also the property of the Company.

GENERAL MANAGER'S REPORT.

The Annual Report of Mr. A. B. Emery is presented herewith, and summary of the Special Report of Mr. A. F. Kuehn, a member of the Technical Committee who visited the mine last June.

ORE PRODUCTION.

During the year under review 91,033 tons of ore were produced and sent to the mill and sorting plant, of which 74,564 tons were milled.

CONCENTRATES AND MATTE PRODUCTION.

The production of hand-picked ore and shipping concentrates was 12,117.41 tons, averaging 39.89 per cent. of copper, and of matte 872.03 tons, averaging 57 per cent. of copper, making a total of 12,989.44 tons assaying 41 per cent.

ORE RESERVES.

The ore reserves are estimated at June 30th, 1915, in terms of long tons of unsorted ore—practically proved ore 131,700 tons of 6.6 per cent. copper and prospective ore (in the developed area), 43,700 tons of 3.7 per cent. copper.

This estimate is exclusive of prospective ore in depth, laterally, new discoveries on Messina leases, and on Vogelzang Farm.

To the east of the Messina Mine proper, prospecting work on old workings to the south has disclosed promising prospects, and is producing daily a small tonnage of 7 per cent. ore. To the west at Vogelzang Farm, prospecting has disclosed glance ore.

Developments are also proceeding to the immediate west of the mine, where the prospects look favourable.

REALISATION OF SHIPMENTS.

The consignments were sold on the basis of an average price of £73 10s. for best selected per long ton of copper.

The Options entitling the holders to subscribe for 272,846 unissued shares of the Company expired on the 1st March, 1915. These Options were not exercised and were not renewed. The Company has, therefore, secured control of the whole of its unissued share capital.

RAILWAY.

The Tzaneen-Zoekmakaar Railway Section was opened for traffic on 4th August, 1915. The completion of this section makes a direct route from the mine to Delagoa Bay of 435 miles, as against the old route (via Pretoria) of 697 miles.

The Company has guaranteed to the South African Government for a period of 10 years the payment of any loss that may accrue on the working of the line from the Bandolier Kop-Messina Section, and the Bandolier Kop-Tzaneen Section, the amount payable in any year not to exceed a sum equal to 4½ per cent. on £792,000, the estimated capital cost of the line and rolling stock.

It is hoped that the earnings on these sections will be sufficient to cover the maximum interest of £35,640 per year.

DEVELOPMENT.

Development work and shaft sinking were suspended in August, 1914, and re-commenced in April last.

FLOODS.

Owing to exceptionally heavy rains in January and February, 1915, the Zand River Pumping Station was washed away, and the rains interrupted railway communication with the mine for about six weeks, and caused a partial closing down of the plant.

SECURITIES.

The securities against the loan referred to in last year's Report, less 7,500 Emba Caspian Shares sold during the year for £3,171 8s., are as follow:—

4,200	Shares Camp Bird, Limited.
25,700	Shares Emba Caspian Oil Company, Limited.
6,000	Shares Edmonton Land Syndicate, Limited.
2,694	Shares Santa Gertrudis Company, Limited.
£770	5 per cent. Debentures South Winnipeg, Limited.
105,000	Shares South Winnipeg, Limited.
£34,500	5 per cent. Debentures St. Petersburg Land and Mortgage Co., Ltd.
2,000	Shares British Foreign and Colonial Corporation, Limited.
15,500	Shares Alberta Land Company, Limited.
£600	5 per cent. Debentures Alberta Land Company, Ltd.
3,000	Shares Southern Alberta Land Company, Ltd.
£160,000	Debentures Canadian Agency, Limited.

With reference to the 105,000 shares in the South Winnipeg, Limited, this number will be reduced to 42,000, 60 per cent. having to be surrendered to that Company's Debenture holders as compensation for certain modification of their rights, in order that additional funds may be raised by prior lien charges or otherwise.

In the case of the St. Petersburg Land and Mortgage Company, the assets of which consist of freehold property in Petrograd, the Debenture holders' rights have been modified by postponing the payment of interest accruing during the present war, or within six months after its termination; as to one-half of such interest, until 12 months, and as to the other half, until 18 months after the termination of the war.

PROFIT AND LOSS ACCOUNT.

After making proper allowance for depreciation of plant and machinery, the gross profit for the year is £130,526 0s. 8d. Out of this amount £15,000 has been applied in the payment of Debenture Interest and £25,467 18s. 6d. in providing for Income Tax and Profit Tax in South Africa. Of the balance remaining, namely, £90,058 2s. 2d., £50,000 has been applied to writing down the Canadian Agency, Limited (in liquidation), Loan Account, £8,000 in writing down the amount due from Messrs. Chaplin, Milne, Grenfell and Co., Limited (in liquidation), and £23,304 4s. 1d. in writing off Shaft and Railway outlay accounts. The balance of £8,753 18s. 1d., together with £763 8s. 5d. brought forward from last year, amounts to £9,517 6s. 6d. and is carried forward.

In accordance with the Articles of Association, Mr. R. J. Frecheville retires from the Board, and, being eligible, offers himself for re-election.

The Auditors, Messrs. Allen, Attfield and Co., also retire, and offer themselves for re-election.

By Order of the Board,

A. A. KELSEY, Secretary.

1, London Wall Buildings,
London, E.C., 5th November, 1915.

The Messina (Transvaal) Development Company, Limited—continued.

BALANCE SHEET, 30th June, 1915.

Dr.

To Capital—		
Authorised.		
1,000,00 Shares of 5s. each...	£250,000 0 0	
Issued.		
727,154 Shares		£181,788 10 0
,, Six per cent. Debenture Stock ...		250,000 0 0
,, Debenture Interest Outstanding ...		6,818 19 2
,, Sundry Creditors—		
South Africa (including provision for Income and Profits Tax in S.A., £25,467 18s. 6d.)...	45,395 10 3	
London (including Advances on account of Product delivered, £56,500)	63,777 10 6	
		109,173 0 9
Note.—There is a contingent liability for Income Tax to 30th June, 1915.		
,, National Bank of South Africa, Ltd.—Net Overdraft		26,681 7 8
,, Profit and Loss Account—		
Balance as at 30th June, 1914 ...	763 8 5	
Add Balance as per Account annexed	8,753 18 1	
		9,517 6 6
		£583,979 4 1

Cr.

By Mining Property—			
As per last Balance Sheet...			£141,671 15 5
,, Prospecting			19,218 16 8
,, Mine Development		£41,786 6 11	
,, Sinking Shafts	£50,624 18 10		
Less written off ...	13,704 11 7		
		36,920 7 3	
			78,706 14 2
,, Buildings, Machinery, Plant, etc....		104,685 8 2	
,, Live Stock, Vehicles, Tools, etc....		3,048 15 1	
			107,734 3 3
,, Concentrates, Matte, etc., in Transit and on Hand			169,662 5 5
,, Lilliput Colliery			6,172 1 8
,, Stores on Hand			16,618 0 11
,, Sundry Debtors and Payments in Advance			3,333 14 8
,, Canadian Agency, Ltd. (in liquidation)—			
Loan against Securities, less amounts written off			37,828 12 0
,, Chaplin, Milne, Grenfell and Co., Ltd. (in liquidation), Current Account, less amount written off ...			3,032 0 9
,, Cash in Hand			0 19 2
			£583,979 4 1

A. A. KELSEY, Secretary.

C. F. H. LESLIE,
JOHN P. GRENFELL, Directors.

We beg to report that we have audited the Balance Sheet of the Messina (Transvaal) Development Company, Limited, dated the 30th June, 1915, and above set forth, in which is incorporated the South African Balance Sheet certified by the Local Auditors. We have obtained all the information and explanations we have required.

In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given us and as shown by the Books of the Company in London and the certified Balance Sheet from South Africa.

ALLEN, ATTFIELD & CO.,
Chartered Accountants, Auditors.

147, Leadenhall Street, E.C.
5th November, 1915.

PROFIT AND LOSS ACCOUNT for the Year ended 30th June, 1915.

To Johannesburg and Mine Expenses—		
Mining, Freight and Transport, etc.	£147,604 1 0	
Development Redemption	20,680 15 0	
Depreciation on Machinery, Plant, etc.	14,389 5 3	
Farm Taxes	7 8 6	
Legal Expenses.	42 9 7	
Agents' Salary and Local Board Fees	1,215 0 0	
General Charges, Cables, Postage, Stationery, Printing, etc....	720 9 9	
Audit Fee	78 15 0	
Exchange and Commission...	511 1 0	
		£185,249 5 1
,, London Expenditure—		
Directors' and Trustees' Fees	1,500 0 0	
Technical Committee Fees ... ..., ...	1,486 12 10	
Salaries and Rent	750 0 0	
General Charges, Cables, Postage, Stationery, Printing and Advertising...	958 19 2	
Interest and Commission	5,935 16 7	
Audit Fee	31 10 0	
Legal Expenses	396 4 10	
Consulting Engineer's and Metallurgist's Fees and Expenses... ...	2,644 0 3	
Income Tax	381 18 4	
		14,085 2 0
		£199,334 7 1
,, Balance carried down...		130,526 0 8
		£329,860 7 9
To Interest on Debenture Stock		£15,000 0 0
,, Income and Profits Tax (provision) in South Africa		25,467 18 6
,, Proportion of Losses on Current and Loan Accounts		58,000 0 0
,, Amount written off Sinking Shafts and Railway Outlay Accounts...		23,304 4 1
		£121,772 2 7
,, Amount carried to Balance Sheet...		8,753 18 1
		£130,526 0 8

By Realisation Account	£329,282 10 7
,, Transfer Fees	15 14 6
,, Sundry Revenue	562 2 8
	£329,860 7 9
By Balance brought down	£130,526 0 8
	£130,526 0 8

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THIS IS IN ADDITION TO THE INCREASE OF 30,000 SHARES JUST REGISTERED, THE WHOLE OF WHICH ISSUE IS TAKEN UP.

5,000 OF THE 20,000 HAVE BEEN GUARANTEED.

Applications will be dealt with strictly in rotation.

Subscribers have 18 Months in which to complete payments.

Applications received before the 15th MARCH, 1916, will carry the right to increase their applications by 100 per cent. at par up to the 31st DEC., 1917.

Forms of Application and full particulars may be obtained from---

The Secretary, P.O. Box 2089, Johannesburg.

By Order of the Board,

C. W. HERALD, Secretary.

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